APDS PARKING
EXTENSIONS

Interface Specification

APX Specification: technical documentation

Version 0.16.0 (draft)

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Introduction

The APDS 4.1 set gives its interface as an OpenAPI document, `apds-api-4.1.yaml`, alongside the Overview, Information Model, Data Dictionary and Use Case Document. APX does the same: the normative interface is `spec/dist/apx-v1.yaml` (OpenAPI 3.1). This document is a readable listing of that file, generated from it each time the documents are built. Where the two differ, the OpenAPI document wins.

The data elements the operations carry are defined in 03 Data Dictionary. The rules for using them are in the APX standard text, Parts 0 to 24 (`docs/standard/`).

Two surfaces on one host

One host serves both surfaces:

- **APDS 4.1 native routes** at their published paths (`/places`, `/sessions`, `/webhooks` and so on). APX carries them unchanged, apart from the corrections listed in 06, Part A, and adds only optional parameters such as the change-feed `mode` and `cursor` (Part 5 §5.2).
- **APX routes** under the `/v1` prefix.

The "Origin" row in each operation says which surface it belongs to.

Conventions that apply to every operation

Topic	Rule	APX reference
Authentication	OAuth 2.0 client credentials. APDS native routes use the APDS `oAuth` scheme and scopes (`po`, `sp`, `ep`, `ad`). APX routes use `apxOAuth` scopes.	Part 9 §9.1, §9.2
Grants	A token carries place grants. A request outside its grant is refused with `insufficient-grant`.	Part 9 §9.3, §9.3a
Identity and versions	Every APX record has an `id` and a `version`. Writes use optimistic concurrency; replays with the same idempotency key return the first result.	Part 4 §4.1, §4.2a
Extensions	Implementer data goes in the `extensions` container under a namespaced key.	Part 4 §4.3, Part 10
Errors	Errors are RFC 9457 problem details with an APX problem type.	Part 12
Lists and change feeds	Lists are paginated. `mode=change` with a `cursor` returns only what changed.	Part 5 §5.2
Events	Subscribers receive signed webhook deliveries in a common event envelope.	Part 8, Part 9 §9.4
Commands	Device commands are requested, may need approval, and report a result.	Part 6

How to read an operation

Each operation has a summary table (operation id, origin, scopes and request body), a parameter table and a response table. Body types name the class in 03 Data Dictionary. Responses that every operation shares, such as 401, 403 and 429, are listed each time so that each operation can be read on its own.

Operations at a glance

The APX OpenAPI document declares 207 operations and 6 webhooks. 40 operations are APDS 4.1 native routes that APX carries; the rest are defined by APX.

Group	Tag	Operations
Start here	Discovery	3

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Group	Tag	Operations
Platform	Data	2
Platform	Subscription	7
Platform	Control	8
Platform	Alerts	5
Platform	Site configuration	12
Platform	UI launch	5
Commerce	Accounts	14
Commerce	Reservations	3
Commerce	Permits	2
Commerce	Validations	17
Commerce	Tolling	8
Vehicles and access	LPR	7
Vehicles and access	Credentials	11
Vehicles and access	Valet	12
Vehicles and access	Charging	9
Enforcement and service	Violations	24
Enforcement and service	Plate lists	8
Enforcement and service	Resolution	8
Enforcement and service	Support	4
Webhooks (event deliveries)	Webhooks	6
APDS 4.1 native routes	Places	5
APDS 4.1 native routes	Observation	5
APDS 4.1 native routes	Organisations	5
APDS 4.1 native routes	Right Specifications	5
APDS 4.1 native routes	Rate Tables	5
APDS 4.1 native routes	Sessions	5
APDS 4.1 native routes	Assigned Rights	5
APDS 4.1 native routes	Quote	3

1 Start here

1.1 Discovery

Where every integration starts. A partner needs exactly one thing to begin: a hostname.

Method	Path	Summary	Scopes
GET	`/v1/digest-keys`	The keys behind `apds-ext:apx:credential-digest@1.0`	`apx.digest:use`
GET	`/v1/discovery`	Credential-scoped capability document	
GET	`/.well-known/apx-configuration`	Bootstrap configuration document	

1.1.1 GET /v1/digest-keys

The keys behind `apds-ext:apx:credential-digest@1.0`. The digest keys the implementation currently signs credential digests with, so an authorised consumer can compute the digest of a plate it holds and match it to decorated records without ever receiving plates (Part 9 §9.6 rule 6). Rotation is by `keyId`; both keys are served during an overlap. The normalization the implementation applies before hashing is stated per key.

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Item	Value
Operation id	`get-apx-v1-digest-keys`
Origin	APX
Scopes	`apx.digest:use`
Request body	—

Response	Body	Meaning
200	object	The keys.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

1.1.2 GET /v1/discovery

Credential-scoped capability document. Reflects the presented token's scopes and grants exactly: the endpoints, command types, topics, and place subtrees THIS client can use. Soundness rule: everything listed is callable; APX endpoints not listed fail with 403.

Item	Value
Operation id	`get-apx-v1-discovery`
Origin	APX
Scopes	none
Request body	—

Response	Body	Meaning
200	DiscoveryDocument	The capability document for this credential.
401	Problem	Missing/invalid token.
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

1.1.3 GET /.well-known/apx-configuration

Bootstrap configuration document. Unauthenticated bootstrap document. Advertises the token endpoint, the APDS version this implementation extends, supported APX conformance classes, and code-list registry locations.

Item	Value
Operation id	`get-well-known-apx-configuration`
Origin	APX
Scopes	none
Request body	—

Response	Body	Meaning
200	ApxConfiguration	Bootstrap configuration
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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2 Platform

2.1 Data

Reading and writing parking data, and staying in sync.

Method	Path	Summary	Scopes
GET	`/v1/places/{id}/occupancy`	Current occupancy snapshot for a place element	`apx.data:read`
GET	`/v1/places/{id}/occupancy/history`	Occupancy per clock interval for one element	`apx.data:read`

2.1.1 GET /v1/places/{id}/occupancy

Current occupancy snapshot for a place element. "How full is it right now" for one HierarchyElement, without pulling the Place hierarchy. A pure convenience READ over the APDS occupancy model (Supply + DemandTable) — the Place payload remains the source of truth. Fields the implementation does not know are simply absent. Threshold crossings publish apx.data.occupancy.v1 and SHOULD raise an occupancyThresholdExceeded alert (Part 7). Scope apx.data:read; the place grant must cover the element.

Item	Value
Operation id	`get-apx-v1-places-id-occupancy`
Origin	APX
Scopes	`apx.data:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	HierarchyElement UUID (Place, Level, Area, …).

Response	Body	Meaning
200	OccupancySnapshot	The occupancy snapshot.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place element.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.1.2 GET /v1/places/{id}/occupancy/history

Occupancy per clock interval for one element. The history behind the §5.5 snapshot (Part 5 §5.5a), derived from the APDS DemandTable records the implementation holds for the element. Buckets align to `interval` boundaries in the place's time zone; an element the implementation holds no occupancy for is 404 `target-not-found`; the `apx_places` grant must cover the element.

Item	Value
Operation id	`get-apx-v1-places-id-occupancy-history`
Origin	APX
Scopes	`apx.data:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`from`	query	yes	string date-time	

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Parameter	In	Required	Type	Description
`to`	query	yes	string date-time	
`interval`	query	no	string	Bucket length (ISO 8601 duration); default `PT1H`. Servers MAY refuse an interval shorter than their sampling with 400.

Response	Body	Meaning
200	OccupancyHistoryPage	The buckets.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2 Subscription

Push instead of poll. A superset-compatible profile of the APDS 4.1 `/webhooks` endpoint: stock APDS subscription bodies work here unmodified.

Method	Path	Summary	Scopes
GET	`/webhooks`	List subscriptions (APX additive operation)	`apx.subscriptions:manage` `po` `sp` `ad`
POST	`/webhooks`	Subscribe to event topics (APDS-compatible superset)	`apx.subscriptions:manage` `po` `sp` `ad`
GET	`/webhooks/{id}`	Read one subscription (APX additive operation)	`apx.subscriptions:manage` `po` `sp` `ad`
PATCH	`/webhooks/{id}`	Update a subscription (APX additive operation)	`apx.subscriptions:manage` `po` `sp` `ad`
DELETE	`/webhooks/{id}`	Revoke (delete) existing subscription	`apx.subscriptions:manage` `po` `sp` `ad`
GET	`/webhooks/{id}/deliveries`	Delivery ledger for a subscription	`apx.subscriptions:manage` `po` `sp` `ad`
GET	`/v1/events/stream`	Server-Sent Events stream (conformance class apx-events-sse)	`apx.subscriptions:manage`

2.2.1 GET /webhooks

List subscriptions (APX additive operation). Lists subscriptions visible to the caller. Secrets are never returned.

Item	Value
Operation id	`get-webhooks`
Origin	APX
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	—

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Parameter	In	Required	Type	Description
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated subscription list (APDS PaginatedList shape).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.2 POST /webhooks

Subscribe to event topics (APDS-compatible superset). Creates a subscription. A stock APDS 4.1 `EventSubscription` (`{endpoint, topics[]}` with EventTypeEnum values) is a valid body; APX fields (transport, filters, secret) are additive.

Item	Value
Operation id	`post-webhooks`
Origin	APDS 4.1 native route
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	ApxEventSubscription

Parameter	In	Required	Type	Description
`Prefer`	header	no	string (return=representation)	RFC 7240. `return=representation` selects the APX-rich 201 response (subscription + one-time secret). Absent, the server answers with the stock APDS 200/202 ResponseStatus contract.
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	ResponseStatus	Stock APDS contract — subscription approved and activated (request did not ask for the APX representation). `ids[]` carries the new subscription's id as its single entry, so a stock client can later revoke it (Part 8 §8.1).
201	ApxEventSubscription	APX contract (Prefer: return=representation) — subscription created; includes the signing secret, exactly once.
202	ResponseStatus	Stock APDS contract — subscription request received; will be processed and then approved/declined. `ids[]` carries the new subscription's id as its single entry (Part 8 §8.1).
400	Problem	An unregistered topic (`unknown-topic`), or a body that fails the schema or a field rule (`invalid-request`, with `errors[]`): a webhook-transport subscription without `endpoint`, an empty `topics[]`, a secret under 32 bytes of entropy, or an `extensions` key outside the Part 4 §4.3 pattern.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	The `Idempotency-Key` was already used with a different body (`idempotency-conflict`). A replay with the same body returns the subscription as it now stands (Part 4 §4.2a) — never the secret a second time.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.3 GET /webhooks/{id}

Read one subscription (APX additive operation). Returns one subscription the caller may see — its status, `activeKeyIds`, and filters — without paging through `GET /webhooks`. Secrets are never returned. Readable in

every state, including `failed` (Part 8 §8.1).

Item	Value
Operation id	`get-webhooks-id`
Origin	APX
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the existing subscription

Response	Body	Meaning
200	ApxEventSubscription	The subscription (secret never returned).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.4 PATCH /webhooks/{id}

Update a subscription (APX additive operation). Update topics, endpoint, filters, or status (pause, resume a paused or failed subscription), or rotate the secret. The body is a JSON Merge Patch over the subscription: send only what changes (Part 8 §8.1). The precondition is `If-Match` or the body `version`; a stale one is 409 `version-conflict` (Part 4 §4.2a). While the subscription is `failed`, the only PATCH accepted is one that sets `status: active`; any other is 410 `subscription-failed`.

Item	Value
Operation id	`patch-webhooks-id`
Origin	APX
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	ApxEventSubscriptionPatch

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the existing subscription
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	ApxEventSubscription	Updated subscription (secret never returned).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such subscription.
409	Problem	Stale `If-Match` or body `version` (`version-conflict`, Part 4 §4.2a).

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Response	Body	Meaning
410	Problem	The subscription is `failed` and the body does not set `status: active` (`subscription-failed`, Part 8 §8.1).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.5 DELETE /webhooks/{id}

Revoke (delete) existing subscription. Native APDS 4.1 operation, unchanged (APDS ResponseStatus shape).

Item	Value
Operation id	`delete-webhooks-id`
Origin	APDS 4.1 native route
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the existing subscription

Response	Body	Meaning
200	ResponseStatus	Subscription deleted.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Subscription not found.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.6 GET /webhooks/{id}/deliveries

Delivery ledger for a subscription. Returns the delivery records for auditing: one per (event, subscription), with the attempt count, status, last HTTP code, and the per-attempt history (`attemptHistory`: each attempt's `APX-Delivery-Id`, time, and code — Part 8 §8.3). Newest first. Readable in every subscription state. An event held while the subscription is `paused` has no record until its first attempt.

Item	Value
Operation id	`get-webhooks-id-deliveries`
Origin	APX
Scopes	`apx.subscriptions:manage`, `po`, `sp`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	
`page`	query	no	integer	The page number for paginated responses.
`status`	query	no	string (delivered, retrying, failed)	Only records in this delivery status.
`eventId`	query	no	string uuid	Only the record of this EventEnvelope.id.
`since`	query	no	string date-time	Only records whose latest attempt is at or after this instant (RFC 3339).

Response	Body	Meaning
200	object	Delivery records.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such subscription.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.2.7 GET /v1/events/stream

Server-Sent Events stream (conformance class apx-events-sse). Streams EventEnvelopes for a subscription with `transport: sse`. Frame grammar (normative, Part 8 §8.4): one event per frame, an `id:` line carrying the per-subscription sequence (a decimal integer), a single `data:` line carrying the envelope JSON, and a blank line; `retry:` and comment lines MAY appear. Reconnect with `Last-Event-ID` to resume strictly after that sequence.

Item	Value
Operation id	`get-apx-v1-events-stream`
Origin	APX
Scopes	`apx.subscriptions:manage`
Request body	—

Parameter	In	Required	Type	Description
`subscription`	query	yes	string uuid	
`Last-Event-ID`	header	no	string	

Response	Body	Meaning
200	string	text/event-stream of EventEnvelope objects, one per frame (`id: <sequence>`, `data: <EventEnvelope JSON>`, blank line).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such subscription, or its transport is not sse — both `target-not-found` (transport is checked before status).
410	Problem	The subscription exhausted its retry schedule and is failed (`subscription-failed`), or `Last-Event-ID` is older than the server's buffer (`stream-position-expired`) — Part 8 §8.4.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3 Control

Doing things in the real world. APDS inventories devices and marks access-controlled places but defines no actuation. This is it.

Method	Path	Summary	Scopes
GET	`/v1/commands`	List and filter commands (the audit query)	`apx.control:read`
POST	`/v1/commands`	Execute a command (idempotent, perishable, audited)	`apx.control:execute`
GET	`/v1/commands/{id}`	Read a command (lifecycle + audit trail)	`apx.control:read`
POST	`/v1/commands/{id}/cancel`	Cancel a command before dispatch	`apx.control:execute`
GET	`/v1/devices`	List device status overlays	`apx.control:read`
GET	`/v1/devices/{id}`	Read one device's status overlay	`apx.control:read`
GET	`/v1/lanes/{id}/current`	Lane inquiry — current transaction context (screen-pop)	`apx.control:read`
GET	`/v1/validations/providers`	List validation providers for a place	`apx.control:read`

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2.3.1 GET /v1/commands

List and filter commands (the audit query). The commands the caller may see, newest first by the time the command was received, each with its full `statusHistory` (Part 6 §6.1b). Only commands whose target lies inside the token's `apx_places` grant are returned; naming a `place` outside the grant is 403 `insufficient-grant`. All filters combine with AND.

Item	Value
Operation id	`get-apx-v1-commands`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`target`	query	no	string uuid	Commands whose `target.id` is this device, lane, or place.
`place`	query	no	array of string	Comma-separated HierarchyElement ids; subtree-inclusive (a command at a lane matches its parent Place).
`commandType`	query	no	string	An apx-command-types value (or an implementer's own).
`status`	query	no	string (received, accepted, rejected, dispatched, executing, succeeded, failed, expired, cancelled)	
`agent`	query	no	string	Commands whose `agent` equals this principal.
`since`	query	no	string date-time	Received at or after this instant (the first `statusHistory` entry).
`until`	query	no	string date-time	Received before this instant.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated commands (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.2 POST /v1/commands

Execute a command (idempotent, perishable, audited). Requests an operational action (vendGate, lostTicket, pushRate, applyValidation, …). Idempotency-Key REQUIRED. Returns 202 with the Command; poll GET /v1/commands/{id} or subscribe to apx.control.command.status.v1. Requires scope apx.control:execute AND a place grant covering the target.

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Item	Value
Operation id	`post-apx-v1-commands`
Origin	APX
Scopes	`apx.control:execute`
Request body	Command

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	Command	Idempotent replay — same key + same body returns the command as it currently stands, not a snapshot of the first response (Part 4 §4.2a, Part 6 §6.1).
202	Command	Command accepted for asynchronous execution.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`); an unknown `commandType`, a missing `target`, or a parameter that fails its §6.1 definition (`invalid-request`, with `errors[]`); or a command that requires `agent` without one (`agent-required`) — Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope or place grant (Part 9), the current resolution context evaluated the action as not allowed (`action-not-allowed`), or approval evidence is missing (`approval-required`) — Part 17 §17.3.
409	Problem	Idempotency-Key replayed with a different body (`idempotency-conflict`), or `pushNegotiatedRate` / `matchTicket` at a lane with no transaction in progress (`lane-no-current-transaction`) — Part 12.
422	Problem	Refused synchronously, nothing dispatched: command expired before dispatch (`command-expired`); unknown validation provider (`validation-provider-unknown`); `lostTicket` at a place whose applicable rate deck has no `lostTicketFee` line (`lost-ticket-fee-undefined`, Part 6 §6.1); a RateTable not flagged negotiable (`rate-not-negotiable`); a session that is not open (`session-not-open`); or a parameter Reference that names nothing (`reference-unknown`) — Part 12.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.3 GET /v1/commands/{id}

Read a command (lifecycle + audit trail). Returns the Command including its immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-commands-id`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Command	The command.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such command.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.4 POST /v1/commands/{id}/cancel

Cancel a command before dispatch. Allowed in received/accepted states; afterwards 409 command-not-cancellable.

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Item	Value
Operation id	`post-apx-v1-commands-id-cancel`
Origin	APX
Scopes	`apx.control:execute`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Command	Cancelled command.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Not cancellable from the current state (`command-not-cancellable`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.5 GET /v1/devices

List device status overlays. Live DeviceStatus for every SupplementalEquipment the caller may see, optionally narrowed by place and state (Part 6 §6.4). Naming a `place` outside the token's `apx_places` grant is 403 `insufficient-grant`.

Item	Value
Operation id	`get-apx-v1-devices`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	array of string	Comma-separated HierarchyElement ids; subtree-inclusive (a device on a lane matches its parent Place).
`deviceState`	query	no	string	An apx-device-states value, e.g. `fault` for everything in fault.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Device status list.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.6 GET /v1/devices/{id}

Read one device's status overlay. DeviceStatus keyed by the SupplementalEquipment id.

Item	Value
Operation id	`get-apx-v1-devices-id`

Item	Value
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	DeviceStatus	Device status.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such device.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.7 GET /v1/lanes/{id}/current

Lane inquiry — current transaction context (screen-pop). The ticket/credential currently in the machine at this lane, amount due, applied validations, latest LPR read, and monthly-credential context including the last 10 activity events. When no ticket is in the machine — or when a lookup parameter is given — also `matchCandidates[]`: the open sessions at the place that plausibly belong to the vehicle in the lane (Part 6 §6.7), for a driver who has lost the ticket.

Item	Value
Operation id	`get-apx-v1-lanes-id-current`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	VehicularAccess (lane) UUID.
`plate`	query	no	string	Ticket-matching override — the plate as the driver reads it, when the camera missed or misread (Part 6 §6.7).
`phone`	query	no	string	Ticket-matching override — a permit holder's phone number, resolved through the account registry (Part 13 §13.1); never a call-routing identifier (Part 17 §17.1).
`credential`	query	no	string	Ticket-matching override — a credential identification (card number, tag) the driver names.

Response	Body	Meaning
200	LaneStatus	Current lane status.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such lane or no live state.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.3.8 GET /v1/validations/providers

List validation providers for a place. The venues allowed to validate tickets at the place.

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Item	Value
Operation id	`get-apx-v1-validations-providers`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	yes	string uuid	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Validation providers.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.4 Alerts

Knowing something is wrong. A net-new domain: APDS has no alert, event, or notification class.

Method	Path	Summary	Scopes
GET	`/v1/alerts`	List/filter alerts	`apx.alerts:read`
POST	`/v1/alerts`	Raise an alert (idempotent)	`apx.alerts:write`
GET	`/v1/alerts/{id}`	Read an alert	`apx.alerts:read`
POST	`/v1/alerts/{id}/acknowledge`	Acknowledge an alert	`apx.alerts:write`
POST	`/v1/alerts/{id}/resolve`	Resolve an alert	`apx.alerts:write`

2.4.1 GET /v1/alerts

List/filter alerts. Filter by status, severityFloor, type, place (subtree-inclusive), device, relatedEntity, since. Alerts with no place binding (e.g. `webhookDeliveryFailed`) are visible to tokens of the owning organisation and are excluded whenever `place` is given (Part 7 §7.1).

Item	Value
Operation id	`get-apx-v1-alerts`
Origin	APX
Scopes	`apx.alerts:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`status`	query	no	string (raised, acknowledged, resolved, expired)	

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Parameter	In	Required	Type	Description
`severityFloor`	query	no	string (info, warning, minor, major, critical)	
`type`	query	no	string	
`place`	query	no	string uuid	
`device`	query	no	string uuid	Alerts whose `source.device.id` is this SupplementalEquipment.
`relatedEntity`	query	no	string uuid	Alerts whose `relatedEntity.id` is this entity (a Session, a Subscription, a Command…).
`since`	query	no	string date-time	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated alerts (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.4.2 POST /v1/alerts

Raise an alert (idempotent). Raises an alert. The `Idempotency-Key` header is REQUIRED: replaying the same key with the same body returns the alert as it currently stands (200, Part 4 §4.2a); the same key with a different body is 409 idempotency-conflict. A client MAY supply `id` (Part 7 §7.1).

Item	Value
Operation id	`post-apx-v1-alerts`
Origin	APX
Scopes	`apx.alerts:write`
Request body	Alert

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	Alert	Idempotent replay — same key + same body returns the alert as it currently stands (e.g. already acknowledged), not a snapshot of the first response (Part 4 §4.2a).
201	Alert	Alert raised.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the Alert schema, e.g. an unknown `severity` or no `detectionTime` (`invalid-request`, with `errors[]`) — Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body (`idempotency-conflict`), or a client-supplied `id` that already exists (`id-collision`) — Part 12.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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2.4.3 GET /v1/alerts/{id}

Read an alert. Returns the alert including its immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-alerts-id`
Origin	APX
Scopes	`apx.alerts:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Alert	The alert.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such alert.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.4.4 POST /v1/alerts/{id}/acknowledge

Acknowledge an alert. Transition raised → acknowledged. Illegal transitions are 409 `alert-transition-illegal`. The optional body annotates the history entry this transition appends (Part 7 §7.2); a request with no body is unchanged.

Item	Value
Operation id	`post-apx-v1-alerts-id-acknowledge`
Origin	APX
Scopes	`apx.alerts:write`
Request body	AlertTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Alert	Acknowledged alert.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Illegal transition from the current state (`alert-transition-illegal`, Part 7 §7.3).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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2.4.5 POST /v1/alerts/{id}/resolve

Resolve an alert. Transition raised|acknowledged → resolved. Illegal transitions are 409 `alert-transition-illegal`. The optional body annotates the history entry this transition appends (Part 7 §7.2); a request with no body is unchanged.

Item	Value
Operation id	`post-apx-v1-alerts-id-resolve`
Origin	APX
Scopes	`apx.alerts:write`
Request body	AlertTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Alert	Resolved alert.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Illegal transition from the current state (`alert-transition-illegal`, Part 7 §7.3).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5 Site configuration

A location, described by APX alone. Before a call, an agent or a system should be able to learn what a site has without data from any other system: which hardware is on each lane and what each piece does, what it is, what runs on it, where the cameras are and what they see, how a parker reaches help from each lane or door, and who to escalate to.

Method	Path	Summary	Scopes
GET	`/v1/equipment`	List a place's equipment with its roles, makes, versions and areas	`apx.siteconfig:read`
GET	`/v1/equipment/{id}`	Read one piece of equipment	`apx.siteconfig:read`
GET	`/v1/comms-points`	List or look up comms points	`apx.siteconfig:read`
POST	`/v1/comms-points`	Add a comms point	`apx.siteconfig:manage`
GET	`/v1/comms-points/{id}`	Read a comms point	`apx.siteconfig:read`
PUT	`/v1/comms-points/{id}`	Replace a comms point	`apx.siteconfig:manage`
DELETE	`/v1/comms-points/{id}`	Remove a comms point	`apx.siteconfig:manage`
POST	`/v1/identifiers:resolve`	Find the APX record behind another system's id	`apx.siteconfig:read`
POST	`/v1/cameras/{id}/views`	Get a short-lived link to see a camera	`apx.cameras:view`
GET	`/v1/display-records`	List the messages signs showed	`apx.siteconfig:read`
POST	`/v1/display-records`	Record that a sign showed a message	`apx.displays:record`

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Method	Path	Summary	Scopes
GET	`/v1/display-records/{id}`	Read a display record	`apx.siteconfig:read`

2.5.1 GET /v1/equipment

List a place's equipment with its roles, makes, versions and areas. Every SupplementalEquipment at the place, each with its `apds-ext:apx:equipment-detail@1.0` decoration, so a reader learns what the site has from APX alone (Part 26 §26.1). Distinct from `GET /v1/devices`, which serves live state; this serves the description. `mode=change&cursor=` serves the Part 5 §5.2 feed, so an edge or call-centre system keeps a local copy current. Naming a `place` outside the grant is 403 `insufficient-grant`.

Item	Value
Operation id	`get-apx-v1-equipment`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	yes	string uuid	The HierarchyElement subtree root.
`role`	query	no	string	An apx-equipment-roles value.
`area`	query	no	string	An apx-area-types value.
`lane`	query	no	string uuid	Equipment serving this VehicularAccess.
`level`	query	no	string	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated equipment; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.2 GET /v1/equipment/{id}

Read one piece of equipment. The SupplementalEquipment with its APX decorations (Part 26 §26.1).

Item	Value
Operation id	`get-apx-v1-equipment-id`
Origin	APX
Scopes	`apx.siteconfig:read`

Item	Value
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	EquipmentRecord	The equipment record.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.3 GET /v1/comms-points

List or look up comms points. The ways a parker reaches help at the caller's places (Part 26 §26.4). A call platform finds the comms point of an inbound contact with `callerId`, `dialedNumber` or `commsDeviceId`; the answer carries the lane, or the place only. `mode=change&cursor=` serves the Part 5 §5.2 feed.

Item	Value
Operation id	`get-apx-v1-comms-points`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	
`lane`	query	no	string uuid	
`type`	query	no	string	An apx-comms-point-types value.
`callerId`	query	no	string	E.164; matches `callerId`.
`dialedNumber`	query	no	string	E.164; matches `phoneNumber`.
`commsDeviceId`	query	no	string	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated comms points; with `mode=change`, the changes after `cursor` in the same envelope.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.4 POST /v1/comms-points

Add a comms point. Whoever runs the calls adds the comms point, the call centre or the call platform (Part 26 §26.4). `place` must lie inside the grant (403 `insufficient-grant`); `lane`, `equipment` and `serves` must exist (422 `reference-unknown`). `Idempotency-Key` optional. Publishes `apx.commspoints.changed.v1`.

Item	Value
Operation id	`post-apx-v1-comms-points`
Origin	APX
Scopes	`apx.siteconfig:manage`
Request body	CommsPoint

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	CommsPoint	Idempotent replay.
201	CommsPoint	Created.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	A `type` outside the registry, or a `place`, `lane`, `equipment` or `serves` that does not exist (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.5 GET /v1/comms-points/{id}

Read a comms point. The comms point with the lane or place it serves and the barrier an agent opens for it (Part 26 §26.4).

Item	Value
Operation id	`get-apx-v1-comms-points-id`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

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Response	Body	Meaning
200	CommsPoint	The comms point.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.6 PUT /v1/comms-points/{id}

Replace a comms point. Full replacement with the version last read as `If-Match` or body `version` (409 `version-conflict`, Part 4 §4.2a). Publishes `apx.commspoints.changed.v1`.

Item	Value
Operation id	`put-apx-v1-comms-points-id`
Origin	APX
Scopes	`apx.siteconfig:manage`
Request body	CommsPoint

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	CommsPoint	Replaced.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Stale version (`version-conflict`).
422	Problem	A `type` outside the registry, or a reference that does not exist (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.7 DELETE /v1/comms-points/{id}

Remove a comms point. The feed emits a tombstone (Part 5 §5.2); publishes `apx.commspoints.changed.v1`.

Item	Value
Operation id	`delete-apx-v1-comms-points-id`
Origin	APX
Scopes	`apx.siteconfig:manage`
Request body	—

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Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
204	—	Removed.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.8 POST /v1/identifiers:resolve

Find the APX record behind another system's id. Looks up a `{system, id}` pair from any `apds-ext:apx:external-ids@1.0` decoration the caller may see (Part 26 §26.6), so a PARCS, a call platform or an aggregator goes from its own id to the place, lane, equipment or comms point without a table of its own. A read, as a POST so the id never sits in a URL. No match is 404 `target-not-found`.

Item	Value
Operation id	`post-apx-v1-identifiers-resolve`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	IdentifierResolveRequest

Response	Body	Meaning
200	IdentifierResolution	The record the id names.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No visible record carries this id (`target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.9 POST /v1/cameras/{id}/views

Get a short-lived link to see a camera. A live stream, a still, or a recording of the camera (the SupplementalEquipment with role `camera`), as a single-use link bound to the agent and valid for at most 5 minutes (Part 26 §26.3). Whoever holds the camera answers; its password never leaves the site. Every view is logged against the agent and `correlationId`. Offered under the `cameraViews` feature; `playback` also needs `cameraPlayback`.

Item	Value
Operation id	`post-apx-v1-cameras-id-views`
Origin	APX
Scopes	`apx.cameras:view`
Request body	CameraViewRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	The camera's SupplementalEquipment id.

Response	Body	Meaning
201	CameraView	The link.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	The camera is offline, has no recorder for `playback`, or the implementation cannot issue a view now (`camera-view-unavailable`).
422	Problem	`playback` with a `from`/`to` outside the camera's retention or missing (`playback-range-unavailable`), or a `kind` the camera's `streams` cannot serve (`request-unprocessable`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.10 GET /v1/display-records

List the messages signs showed. The records that a sign showed a message, newest first (Part 26 §26.9): which sign, which kind of message, when, and for which read or stay. An operator measures the signs with them; an appeal finds the proof of display. `mode=change&cursor=` serves the Part 5 §5.2 feed. A `place` outside the grant is 403 `insufficient-grant`.

Item	Value
Operation id	`get-apx-v1-display-records`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	The HierarchyElement subtree root.
`display`	query	no	string uuid	The sign's SupplementalEquipment id.
`messageKind`	query	no	string	An apx-display-message-kinds value or implementer code.
`session`	query	no	string uuid	Records for this stay.
`observation`	query	no	string uuid	Records triggered by this read.
`since`	query	no	string date-time	Inclusive lower bound on `shownTime`.

Parameter	In	Required	Type	Description
`until`	query	no	string date-time	Exclusive upper bound on `shownTime`.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated display records; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.11 POST /v1/display-records

Record that a sign showed a message. Written by whichever system drove the display, the edge controller, the PARCS or the sign's player, usually with no APX command involved (Part 26 §26.9). `display` must be a SupplementalEquipment (422 `reference-unknown`); the server derives `place` from it. No message text and no plate are stored. With `command`, `shownTime` and `contentHash` must agree with that command's `CommandResult.display`. Immutable once written. `Idempotency-Key` optional. Publishes `apx.displays.shown.v1`.

Item	Value
Operation id	`post-apx-v1-display-records`
Origin	APX
Scopes	`apx.displays:record`
Request body	DisplayRecord

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	DisplayRecord	Idempotent replay.
201	DisplayRecord	Recorded.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	A `display`, `observation`, `session` or `command` that names nothing visible (`reference-unknown`); a body `place` that disagrees with the display's, or a record that disagrees with its command's result (`request-unprocessable`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.5.12 GET /v1/display-records/{id}

Read a display record. What a sign showed, when, and for which read or stay (Part 26 §26.9).

Item	Value
Operation id	`get-apx-v1-display-records-id`
Origin	APX
Scopes	`apx.siteconfig:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	DisplayRecord	The display record.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.6 UI launch

The vendor's own screen, without breaking the record. Most actions in a call centre still happen in a vendor's portal in another window, and the two systems never agree afterwards. A vendor will take years to implement every APX module, but it already has good screens.

Method	Path	Summary	Scopes
GET	`/v1/ui/launches`	List launches	`apx.ui:read`
POST	`/v1/ui/launches`	Open a vendor screen for an agent (handshake launch)	`apx.ui:launch`
GET	`/v1/ui/launches/{id}`	Read a launch and what was done in it	`apx.ui:read`
POST	`/v1/ui/launches/{id}/actions`	Record an action done in the screen (loopback fallback)	`apx.ui:record`
POST	`/v1/ui/launches/{id}/close`	Close a launch	`apx.ui:record`

2.6.1 GET /v1/ui/launches

List launches. The launch records visible to the caller, newest first (Part 25 §25.3). `url` is never included on a list read.

Item	Value
Operation id	`get-apx-v1-ui-launches`
Origin	APX
Scopes	`apx.ui:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	string uuid	Launches at this place or its subtree.
`agent`	query	no	string	
`status`	query	no	string (issued, opened, closed, expired)	
`correlationId`	query	no	string uuid	
`interactionId`	query	no	string	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated launches.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.6.2 POST /v1/ui/launches

Open a vendor screen for an agent (handshake launch). The host sends its normal APX token and gets back a single-use `url` that logs the named agent into the surface, valid for at most 60 seconds (Part 25 §25.2). This is the launch mode for vendors who want header-based authentication, since a browser cannot add headers when it opens a page. `place` must lie inside the grant (403 `insufficient-grant`). `Idempotency-Key` optional (Part 4 §4.2a). Publishes `apx.ui.launch.changed.v1`.

Item	Value
Operation id	`post-apx-v1-ui-launches`
Origin	APX
Scopes	`apx.ui:launch`
Request body	UiLaunchRequest

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	UiLaunch	Idempotent replay.
201	UiLaunch	Issued. `url` and `expiresAt` are set; `status` is `issued`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	A `surface` this implementation does not offer, or not at this place (`ui-surface-unknown`); a `displayMode` the surface does not support (`ui-display-mode-unsupported`); or a `subject`, `place` or `lane` that does not exist (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.6.3 GET /v1/ui/launches/{id}

Read a launch and what was done in it. The launch with its `actions[]` (Part 25 §25.3). `url` is present only while the launch is `issued` and before `expiresAt`.

Item	Value
Operation id	`get-apx-v1-ui-launches-id`
Origin	APX
Scopes	`apx.ui:read`
Request body	—

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Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	UiLaunch	The launch.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.6.4 POST /v1/ui/launches/{id}/actions

Record an action done in the screen (loopback fallback). The surface, or the service behind it, records what the agent did when the implementation could not express it as the module's own resource or Command (Part 25 §25.4). The record carries the launch's `correlationId` and is published as `apx.ui.action.recorded.v1`. A launch that was never opened and has expired refuses with `ui-launch-expired`; a closed one with `ui-launch-closed`.

Item	Value
Operation id	`post-apx-v1-ui-launches-id-actions`
Origin	APX
Scopes	`apx.ui:record`
Request body	UiActionRecord

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
201	UiActionRecord	Recorded.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	The launch is `expired` (`ui-launch-expired`) or `closed` (`ui-launch-closed`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

2.6.5 POST /v1/ui/launches/{id}/close

Close a launch. The screen reports it is done: `opened` (or `issued`) → `closed` (Part 25 §25.3). No body. Publishes `apx.ui.launch.changed.v1`. Already closed is 409 `ui-launch-closed`.

Item	Value
Operation id	`post-apx-v1-ui-launches-id-close`
Origin	APX

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Item	Value
Scopes	`apx.ui:record`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	UiLaunch	The closed launch.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Already closed (`ui-launch-closed`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3 Commerce

3.1 Accounts

Money. Account and balance lookup, taking a payment, refunds, voids and captures, accounting write-back, and payment history.

Method	Path	Summary	Scopes
POST	`/v1/accounts:search`	The account lookup with personal data in a body, never a URL	`apx.accounts:read`
POST	`/v1/payments:search`	The payment-history lookup with the keys in a body	`apx.accounts:read`
GET	`/v1/accounts`	Look up accounts by name/phone/email/card/plate	`apx.accounts:read`
GET	`/v1/accounts/{id}`	Full account info	`apx.accounts:read`
GET	`/v1/payments`	Payment history by ticket, card digits, or account	`apx.accounts:read`
POST	`/v1/payments`	Take a payment (idempotent)	`apx.payments:write`
POST	`/v1/payments/{id}/postings`	Accounting write-back (PARIS-style)	`apx.payments:write`
POST	`/v1/payments/{id}/refund`	Refund a payment (financial domain action)	`apx.payments:write`
POST	`/v1/payments/{id}/void`	Void a hold (an authorized, uncaptured payment)	`apx.payments:write`
POST	`/v1/payments/{id}/capture`	Capture a hold (a previously authorized payment)	`apx.payments:write`
POST	`/v1/payment-links`	Send a hosted payment link	`apx.payments:write`
GET	`/v1/payment-links/{id}`	Read a payment link	`apx.accounts:read` `apx.payments:write`
POST	`/v1/payment-links/{id}/cancel`	Cancel a payment link	`apx.payments:write`
POST	`/v1/payments/{id}/receipt`	Send the receipt again	`apx.payments:write`

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3.1.1 POST /v1/accounts:search

The account lookup with personal data in a body, never a URL. The same lookup as `GET /v1/accounts` (Part 13 §13.1) with the keys in the body (Part 9 §9.6). Same rules, grant behaviour, and response; a card number pasted into `card` is 422 `personal-data-not-permitted`.

Item	Value
Operation id	`post-apx-v1-accounts-search`
Origin	APX
Scopes	`apx.accounts:read`
Request body	AccountSearch

Response	Body	Meaning
200	object	Matching accounts.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
422	Problem	More than truncated card digits in `card` (`personal-data-not-permitted`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.2 POST /v1/payments:search

The payment-history lookup with the keys in a body. The same lookup as `GET /v1/payments` (Part 13 §13.2) with the keys in the body (Part 9 §9.6). Same keys rule (at least one), 8-hour window on truncated keys, hold rules, grant behaviour, and response.

Item	Value
Operation id	`post-apx-v1-payments-search`
Origin	APX
Scopes	`apx.accounts:read`
Request body	PaymentSearch

Response	Body	Meaning
200	object	Matching payments.
400	Problem	No key given (`invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
422	Problem	More than four card digits in `cardLast4` (`personal-data-not-permitted`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.3 GET /v1/accounts

Look up accounts by name/phone/email/card/plate. Any combination of filters; returns accounts with balances and status. Results are constrained to the caller's `apx_places` grant (Part 13 §13.5); under an absent or empty grant the answer is an empty 200 (Part 9 §9.3a).

Item	Value
Operation id	`get-apx-v1-accounts`
Origin	APX

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Item	Value
Scopes	`apx.accounts:read`
Request body	—

Parameter	In	Required	Type	Description
`name`	query	no	string	
`phone`	query	no	string	
`email`	query	no	string	Exact contact e-mail (case-insensitive). Personal data (Part 9 §9.6).
`card`	query	no	string	
`plate`	query	no	string	
`place`	query	no	array of string	Narrow results below the grant (Part 13 §13.5(3)): comma-separated HierarchyElement ids, subtree-inclusive. A place outside the caller's grant is 403 `insufficient-grant`. Servers that do not implement narrowing ignore it.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Matching accounts; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.4 GET /v1/accounts/{id}

Full account info. Returns the account including balance and status.

Item	Value
Operation id	`get-apx-v1-accounts-id`
Origin	APX
Scopes	`apx.accounts:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Account	The account.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such account.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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3.1.5 GET /v1/payments

Payment history by ticket, card digits, or account. Payments made on a ticket or an account (Part 13 §13.2). At least one key — `ticketLast4`, `cardLast4`, `ticketNumber`, or `account` — is REQUIRED; `date` and `place` only narrow, and a query with no key is 400 `invalid-request`. Privacy rule: a truncated-key lookup without a `date` is constrained to the last 8 hours; `ticketNumber` and `account` are exempt. Results are constrained to the caller's grant (§13.5). Holds (`captureStatus: authorized`) are omitted unless `captureStatus=authorized` is asked for.

Item	Value
Operation id	`get-apx-v1-payments`
Origin	APX
Scopes	`apx.accounts:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`ticketLast4`	query	no	string	
`cardLast4`	query	no	string	Truncated payment-card digits — the transient-parker lookup of last resort (no LPR, no readable ticket). Same recent-window privacy rule as ticketLast4. At most four digits: a value carrying more is refused with 422 `personal-data-not-permitted` before the request is logged (Part 13 §13.2).
`ticketNumber`	query	no	string	Full ticket number, exact match. Exempt from the 8-hour window.
`account`	query	no	string uuid	Account id — every payment on the account (a statement view). Exempt from the 8-hour window.
`date`	query	no	string date	
`place`	query	no	array of string	Narrow results below the grant (Part 13 §13.5(3)): comma-separated HierarchyElement ids, subtree-inclusive. A place outside the caller's grant is 403 `insufficient-grant`. Never a key on its own.
`captureStatus`	query	no	string (authorized, captured)	`authorized` lists only holds (authorization-only payments not yet captured), which are otherwise never returned; `captured` lists only collected payments (the default behaviour made explicit). Absent = holds excluded (Part 13 §13.2). Never a key on its own.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Matching payments; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
422	Problem	A query parameter carries more card digits than the truncated last four (`personal-data-not-permitted`, Part 13 §13.2). The server refuses before logging the request.

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.6 POST /v1/payments

Take a payment (idempotent). Takes a payment against an account or ticket. Idempotency-Key REQUIRED. `channel: autoAttendant` = a PCI-compliant IVR captures the card out of band; APX never carries PANs. Declines are 422. With `captureLater: true` the payment is authorized only: a hold, created `paymentStatus: approved` with `captureStatus: authorized`, returned to this caller but not published or listed by default until captured (Part 13 §13.1a).

Item	Value
Operation id	`post-apx-v1-payments`
Origin	APX
Scopes	`apx.payments:write`
Request body	PaymentRecord

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	PaymentRecord	Idempotent replay — same key + same body returns the payment the key created, in its current representation (Part 4 §4.2a).
201	PaymentRecord	Approved payment with transactionID (a hold with `captureStatus authorized` when `captureLater` was asked).
400	Problem	Missing Idempotency-Key (`idempotency-key-required`), or a body that fails the schema or names neither `account` nor `ticketNumber` to settle (`invalid-request`, Part 12).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body (`idempotency-conflict`).
422	Problem	Payment declined (`payment-declined`; the problem SHOULD carry a `payment` member referencing the recorded declined PaymentRecord, Part 13 §13.1); a body carrying card data beyond the truncated last four (`personal-data-not-permitted`, refused before it is persisted or logged); `captureLater` on a server without an authorization lifecycle, or `apds-ext:apx:payment-detail@1.0` lines whose `paymentType: payment` values do not sum to `amount` or whose `paymentType` contradicts the `validation` code (`request-unprocessable`, nothing charged, Part 13 §13.6a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.7 POST /v1/payments/{id}/postings

Accounting write-back (PARIS-style). Posts the payment to the monthly-parking/AR system; returns confirmation and new balance. Only an `approved` payment can be posted; any other state is 409 `payment-state-illegal` (Part 13 §13.1a).

Item	Value
Operation id	`post-apx-v1-payments-id-postings`
Origin	APX
Scopes	`apx.payments:write`
Request body	PostingRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

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Response	Body	Meaning
201	Posting	Posting result.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such payment.
409	Problem	The payment is not `approved` (`payment-state-illegal`, Part 13 §13.1a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.8 POST /v1/payments/{id}/refund

Refund a payment (financial domain action). Refunds the payment fully, or partially per `amount`. A financial action per Part 17 §17.4 — never a control command. Idempotency-Key REQUIRED; approval evidence required when the resolution context's AllowedAction said so. Scope apx.payments:write.

Item	Value
Operation id	`post-apx-v1-payments-id-refund`
Origin	APX
Scopes	`apx.payments:write`
Request body	object

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	PaymentRecord	The payment with `refundedAmount` increased; `reversed` once the cumulative refund reaches `amount`, otherwise still `approved` (Part 13 §13.1a).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such payment.
409	Problem	Not refundable in its current state — only `approved` is (`payment-state-illegal`, Part 13 §13.1a) — or Idempotency-Key replayed with a different body (`idempotency-conflict`).
422	Problem	The requested `amount` exceeds what remains refundable (`amount` minus `refundedAmount`) — `request-unprocessable`.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.9 POST /v1/payments/{id}/void

Void a hold (an authorized, uncaptured payment). Financial domain action (Part 17 §17.4). Releases a hold (`captureStatus: authorized`): `paymentStatus` becomes `reversed`, nothing was collected, and no event is published (Part 13 §13.1a). Idempotency-Key REQUIRED. Scope apx.payments:write.

Item	Value
Operation id	`post-apx-v1-payments-id-void`

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Item	Value
Origin	APX
Scopes	`apx.payments:write`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	PaymentRecord	The voided payment, now `reversed`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such payment.
409	Problem	Not a hold — already captured, declined, or reversed (`payment-state-illegal`) — or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.10 POST /v1/payments/{id}/capture

Capture a hold (a previously authorized payment). Financial domain action (Part 17 §17.4). Settles a hold: `captureStatus` `authorized` → `captured` (`paymentStatus` stays `approved`), optionally for a lower `amount` than was authorized. The capture is when the payment is published and materialized (Part 13 §13.1a). Idempotency-Key REQUIRED. Scope apx.payments:write.

Item	Value
Operation id	`post-apx-v1-payments-id-capture`
Origin	APX
Scopes	`apx.payments:write`
Request body	object

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	PaymentRecord	The captured payment, now `captureStatus` `captured` with `amount` = the captured amount.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such payment.
409	Problem	Not a hold — already captured, declined, or reversed (`payment-state-illegal`, Part 13 §13.1a) — or Idempotency-Key replayed with a different body (`idempotency-conflict`).
422	Problem	Capture `amount` exceeds the authorized amount (`request-unprocessable`).

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.11 POST /v1/payment-links

Send a hosted payment link. The customer-service payment action of first resort (Part 13 §13.1a): sends a hosted payment link via the given channel for an account, ticket, or session. APX never carries PANs. Idempotency-Key REQUIRED. Scope apx.payments:write. Payment completion arrives as apx.accounts.payment.recorded.v1.

Item	Value
Operation id	`post-apx-v1-payment-links`
Origin	APX
Scopes	`apx.payments:write`
Request body	PaymentLink

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	PaymentLink	Idempotent replay — same key + same body returns the link the key created, in its current representation (`status` may have advanced; Part 4 §4.2a).
201	PaymentLink	The link, sent.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`), or a body that fails the schema or names no account, ticket, or session to settle (`invalid-request`, Part 12).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	A `channel` this server does not deliver on (`request-unprocessable`), or a body carrying card data (`personal-data-not-permitted`, refused before it is persisted or logged; Part 13 §13.1).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.12 GET /v1/payment-links/{id}

Read a payment link. The link's current lifecycle state (`sent → opened → paid | expired | cancelled`, Part 13 §13.1a) and, once paid, the resulting PaymentRecord. Grant-checked on the link's `place`.

Item	Value
Operation id	`get-apx-v1-payment-links-id`
Origin	APX
Scopes	`apx.accounts:read`, `apx.payments:write`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	PaymentLink	The payment link.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

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Response	Body	Meaning
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.13 POST /v1/payment-links/{id}/cancel

Cancel a payment link. Kills a link before the customer pays (sent to the wrong number, paid another way): `sent | opened → cancelled`. The hosted page MUST stop accepting payment from that instant. A link that is `paid`, `expired`, or already `cancelled` is 409 `payment-state-illegal` (Part 13 §13.1a). Idempotency-Key optional (Part 4 §4.2a).

Item	Value
Operation id	`post-apx-v1-payment-links-id-cancel`
Origin	APX
Scopes	`apx.payments:write`
Request body	PaymentLinkCancel

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	PaymentLink	The link, now `cancelled` (or its current representation on an idempotent replay).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	The link is `paid`, `expired`, or already `cancelled` (`payment-state-illegal`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.1.14 POST /v1/payments/{id}/receipt

Send the receipt again. Re-sends the receipt of a settled payment by e-mail, SMS, a re-print at the device, or a short-lived link (Part 13 §13.1a). The destination travels in the body, never in a URL. Accepted for delivery (202); the outcome is in the returned ReceiptDelivery.

Item	Value
Operation id	`post-apx-v1-payments-id-receipt`
Origin	APX
Scopes	`apx.payments:write`
Request body	ReceiptRequest

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Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
202	ReceiptDelivery	Queued or sent.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	The payment is not settled (`payment-state-illegal`, Part 13 §13.1a).
422	Problem	A `channel` this implementation or device cannot serve (`receipt-channel-unsupported`), or a `destination` missing for `email`/`sms` (`request-unprocessable`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.2 Reservations

Booking ahead, expressed as conventions over native APDS routes rather than a parallel booking system.

Method	Path	Summary	Scopes
GET	`/v1/reservations/recent`	A customer's last 10 reservations	`apx.reservations:manage`
PUT	`/v1/sessions/{id}/assigned-right`	Link a session to its AssignedRight (reservation/permit)	`apx.reservations:manage`
POST	`/v1/sessions/{id}/assigned-right/unlink`	Undo a session's link to its AssignedRight	`apx.reservations:manage`

3.2.1 GET /v1/reservations/recent

A customer's last 10 reservations. Customer history for screen-pops and dispute handling: the same holder's most recent reservations (newest planned start first), resolved from a plate or an explicit RightHolder id. At least one of `plate` or `holder` is REQUIRED (400 `invalid-request` otherwise); when both are given the result is their intersection (reservations of that holder carrying that plate). `from`/`to`, `state`, `country`, and `stateProvince` narrow further (Part 14 §14.1a).

Item	Value
Operation id	`get-apx-v1-reservations-recent`
Origin	APX
Scopes	`apx.reservations:manage`
Request body	—

Parameter	In	Required	Type	Description
`plate`	query	no	string	
`holder`	query	no	string uuid	
`country`	query	no	string	Plate issuing country (APDS VehicleAncillaryIdentification.country vocabulary). Qualifies `plate`; absent, the plate string alone is matched.
`stateProvince`	query	no	string	Plate issuing state/province (APDS VehicleAncillaryIdentification.stateProvince vocabulary). Qualifies `plate`.

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Parameter	In	Required	Type	Description
`from`	query	no	string date-time	Only reservations whose `plannedStart` is at or after this instant. `from` later than `to` is 400 `invalid-request`.
`to`	query	no	string date-time	Only reservations whose `plannedStart` is before this instant.
`state`	query	no	string (confirmed, amended, cancelled, checkedIn, noShow)	Only reservations currently in this `reservationState`.
`place`	query	no	string uuid	Scope results to one location (for implementations fronting multiple places). Holder ids are LOCAL to each implementation — there is no central user catalog; cross-system correlation is by plate (Part 14 §14.1a).

Response	Body	Meaning
200	object	Up to 10 reservation summaries.
400	Problem	Neither plate nor holder given, or an inverted `from`/`to` window (problem type `invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The named `place` does not exist (problem type `target-not-found`). A place that exists outside the caller's grant is 403 `insufficient-grant` (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.2.2 PUT /v1/sessions/{id}/assigned-right

Link a session to its AssignedRight (reservation/permit). The explicit reservation↔session link for facilities where the plate cannot be the link (barcode-only reservations, unreadable plates). Mirrors plate correction (Part 17 §17.5): a transactional domain action, naturally idempotent (PUT).

Item	Value
Operation id	`put-apx-v1-sessions-id-assigned-right`
Origin	APX
Scopes	`apx.reservations:manage`
Request body	object

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	APDS Session UUID.
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	object	The link, applied.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such session or AssignedRight.
409	Problem	The AssignedRight is not linkable (`right-not-linkable`: already consumed elsewhere, outside its validity, wrong place, in reservationState `cancelled` or `noShow`, or the session is already linked to a different right), or `If-Match` names a stale Session version (`version-conflict`, Part 4 §4.2a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.2.3 POST /v1/sessions/{id}/assigned-right/unlink

Undo a session's link to its AssignedRight. The audited undo of PUT /v1/sessions/{id}/assigned-right (Part 14 §14.1b): removes the linked AssignedRight from the session's current segment, reverts the segment to the implementation's drive-up right, and returns the reservation to its pre-check-in `reservationState` (`confirmed` or `amended`, clearing `checkInSession`). MUST materialize in the underlying APDS Session and MUST publish SessionUpdated, like the link. `reason` is REQUIRED. Unlinking a session that carries no linked right is a no-op 200 without `unlinkedRight`. A closed Session is 422 `session-not-open`.

Item	Value
Operation id	`post-apx-v1-sessions-id-assigned-right-unlink`
Origin	APX
Scopes	`apx.reservations:manage`
Request body	object

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	APDS Session UUID.
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	object	The session, unlinked.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	`If-Match` names a stale Session version (`version-conflict`, Part 4 §4.2a).
422	Problem	The Session is closed (`session-not-open`); pricing has settled.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.3 Permits

Pooled permits: issuing from a finite allocation, over the APDS right-specification and right-pool model.

Method	Path	Summary	Scopes
GET	`/v1/permits/pools/{rightSpecId}/availability`	Pool availability for a pooled RightSpecification	`apx.permits:manage`
POST	`/v1/permits/issue`	Issue a permit from a pool (multi-vehicle credentials)	`apx.permits:manage`

3.3.1 GET /v1/permits/pools/{rightSpecId}/availability

Pool availability for a pooled RightSpecification. Profile over APDS RightPool — capacity, issued, available — for one pool of the RightSpecification. With neither `pool` nor `at`, the pool whose validity contains now, else the earliest future pool (Part 14 §14.2).

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Item	Value
Operation id	`get-apx-v1-permits-pools-rightspecid-availability`
Origin	APX
Scopes	`apx.permits:manage`
Request body	—

Parameter	In	Required	Type	Description
`rightSpecId`	path	yes	string uuid	
`pool`	query	no	string uuid	A RightPool id of this RightSpecification; takes precedence over `at`.
`at`	query	no	string date-time	Select the pool whose validity contains this instant (e.g. a date in November for a November pool), RFC 3339.

Response	Body	Meaning
200	PoolAvailability	Availability.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No pool for this RightSpecification.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.3.2 POST /v1/permits/issue

Issue a permit from a pool (multi-vehicle credentials). Creates a native AssignedRight (APDS annual-permit pattern — one right, many vehicles), materialized per Part 14 §14.2. Pool exhaustion is 409 pool-exhausted. A client that may retry SHOULD send `Idempotency-Key`: a retried issue without one consumes a second pool slot.

Item	Value
Operation id	`post-apx-v1-permits-issue`
Origin	APX
Scopes	`apx.permits:manage`
Request body	PermitIssueRequest

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	AssignedRight	Idempotent replay — same key + same body returns the AssignedRight the key issued, in its current representation; no second slot is consumed (Part 4 §4.2a).
201	AssignedRight	The issued AssignedRight (native APDS entity).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Pool exhausted (`pool-exhausted`); Idempotency-Key replayed with a different body (`idempotency-conflict`); a stale `rightSpecification.version` (`version-conflict`); or a credential identification already active on another permit at the place (`credential-identification-in-use`, Part 14 §14.2).

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Response	Body	Meaning
422	Problem	The `rightSpecification` or `holder` names nothing that exists or is visible (`reference-unknown`); or the RightSpecification has no `rightPools`, or a `credentialType` is not in its `credentials` allow-list (`request-unprocessable`, `detail` names the rule; Part 14 §14.2).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4 Validations

The merchant side, from enrolment to invoice.

Method	Path	Summary	Scopes
GET	`/v1/validations/programs`	List/filter validation programs	`apx.validations:read` `apx.validations:redeem`
POST	`/v1/validations/programs`	Enrol a validation program (idempotent)	`apx.validations:manage`
GET	`/v1/validations/programs/{id}`	Read a validation program	`apx.validations:read` `apx.validations:redeem`
PUT	`/v1/validations/programs/{id}`	Update a validation program (full update, versioned)	`apx.validations:manage`
GET	`/v1/validations/programs/{id}/issuances`	List issuances for a program	`apx.validations:read` `apx.validations:redeem`
POST	`/v1/validations/programs/{id}/issuances`	Issue a batch of validation instruments (idempotent)	`apx.validations:manage` `apx.validations:redeem`
GET	`/v1/validations/instruments/{code}`	Check a validation code	`apx.validations:read` `apx.validations:redeem`
POST	`/v1/validations/programs/{id}/issuances/{issuanceId}/void`	Void an issuance batch	`apx.validations:manage` `apx.validations:redeem`
POST	`/v1/validations/instruments/{code}/void`	Void a single validation code	`apx.validations:manage` `apx.validations:redeem`
GET	`/v1/validations/redemptions`	List/filter redemptions	`apx.validations:read` `apx.validations:redeem`
POST	`/v1/validations/redemptions`	Record a redemption (idempotent)	`apx.validations:manage` `apx.validations:redeem`
GET	`/v1/validations/redemptions/{id}`	Read a redemption	`apx.validations:read` `apx.validations:redeem`
POST	`/v1/validations/redemptions/{id}/reverse`	Reverse a redemption	`apx.validations:manage`
GET	`/v1/validations/programs/{id}/statement`	Preview a billing statement for a period	`apx.validations:read` `apx.validations:redeem`
GET	`/v1/validations/programs/{id}/statements`	List closed statements for a program	`apx.validations:read` `apx.validations:redeem`

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Method	Path	Summary	Scopes
POST	`/v1/validations/programs/{id}/statements`	Close a billing period (idempotent)	`apx.validations:manage`
GET	`/v1/validations/statements/{id}`	Read a closed statement	`apx.validations:read` `apx.validations:redeem`

3.4.1 GET /v1/validations/programs

List/filter validation programs. Filter by place (subtree-inclusive), provider, and status. A `apx.validations:redeem` token sees only programs whose provider is its own `apx_org` (Part 20 §20.5).

Item	Value
Operation id	`get-apx-v1-validations-programs`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	
`provider`	query	no	string uuid	
`status`	query	no	string (active, suspended, ended)	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated programs (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.2 POST /v1/validations/programs

Enrol a validation program (idempotent). Enrols a merchant to validate parking at a place. `Idempotency-Key` REQUIRED. The program becomes a row in the Part 6 provider lookup for that place while `active`. Publishes `apx.validations.program.status.v1`.

Item	Value
Operation id	`post-apx-v1-validations-programs`
Origin	APX

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Item	Value
Scopes	`apx.validations:manage`
Request body	ValidationProgram

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ValidationProgram	Idempotent replay — same key + same body returns the program's current representation (Part 4 §4.2a).
201	ValidationProgram	Program enrolled.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	`reference-unknown` — `place`, `provider`, or an `applicableRateTables` entry names nothing visible to the caller; or `request-unprocessable` — a benefit carrying none or more than one of amount/duration/percentage (§20.1).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.3 GET /v1/validations/programs/{id}

Read a validation program. Returns the program including rules, billing, and the immutable statusHistory. A `redeem` token reading another provider's program receives 404, exactly as for a program that does not exist (Part 9 §9.3a rule 2; Part 20 §20.5).

Item	Value
Operation id	`get-apx-v1-validations-programs-id`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValidationProgram	The program.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program, or another provider's program under a `redeem` token (`target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.4 PUT /v1/validations/programs/{id}

Update a validation program (full update, versioned). Full-update semantics (Part 5 §5.1): the body carries the complete program. The precondition is the `version` last read, sent as `If-Match: "<version>"` or as the body's `version` (Part 4 §4.2a); a stale one is 409 `version-conflict`. Status transitions: `active ⇄ suspended`, either → `ended` (terminal; 422 `program-not-active` for any transition out of `ended`). Benefit and rule changes apply to redemptions from the update onward; existing instruments keep the benefit they were issued with.

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Item	Value
Operation id	`put-apx-v1-validations-programs-id`
Origin	APX
Scopes	`apx.validations:manage`
Request body	ValidationProgram

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	ValidationProgram	Updated program.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program.
409	Problem	Stale version (`version-conflict`, current version in `detail`).
422	Problem	`program-not-active` — a transition out of `ended`; `request-unprocessable` — a benefit carrying none or more than one of amount/duration/percentage; `reference-unknown` — a body Reference names nothing visible to the caller.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.5 GET /v1/validations/programs/{id}/issuances

List issuances for a program. Batches issued to the program, newest first. Codes are never returned here.

Item	Value
Operation id	`get-apx-v1-validations-programs-id-issuances`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated issuances (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program, or (`mode=change`) a refused cursor (`target-not-found`; Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.6 POST /v1/validations/programs/{id}/issuances

Issue a batch of validation instruments (idempotent). Issues `quantity` instruments of `method` to the program the path names; the body need not repeat `program` (a value that differs from the path is 422 `request-unprocessable`). `Idempotency-Key` REQUIRED — a retried print job must not double the stock. For `code`/`qrCode`/`digital`, the generated `codes[]` are returned in THIS response only. Program must be `active` (422 `program-not-active`).

Item	Value
Operation id	`post-apx-v1-validations-programs-id-issuances`
Origin	APX
Scopes	`apx.validations:manage`, `apx.validations:redeem`
Request body	ValidationIssuanceRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ValidationIssuance	Idempotent replay — returns the issuance's current representation, without codes (Part 4 §4.2a).
201	ValidationIssuance	Batch issued; includes `codes[]` exactly once.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program.
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	`program-not-active` — the program is not `active`; `request-unprocessable` — `method` is not in the program's `issuanceMethods`, or a body `program` differs from the path.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.7 GET /v1/validations/instruments/{code}

Check a validation code. "Is this code good?" — the pay-station / merchant-app read before applying. Returns status, program, validity window, and the benefit. A code the caller's grant cannot see is 404, never 403 (no oracle for guessing codes).

Item	Value
Operation id	`get-apx-v1-validations-instruments-code`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`code`	path	yes	string	

Response	Body	Meaning
200	ValidationInstrument	The instrument.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	Unknown code (or outside the caller's grant).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.8 POST /v1/validations/programs/{id}/issuances/{issuanceId}/void

Void an issuance batch. Transition `issued → void` for the batch, and every instrument in it that is `valid` or `expired → void` (Part 20 §20.2 rule 5) — the stolen sheet of QR codes. Instruments already `redeemed` are unaffected; their redemptions stand until reversed. The result's `voidDetail.voidedCount` says how many codes were voided. A `redeem` token may void only its own provider's batches (another provider's is 404, §20.5). Voiding a batch already `void` returns it unchanged (200). No event is published; the instrument read is the source of truth.

Item	Value
Operation id	`post-apx-v1-validations-programs-id-issuances-issuanceid-void`
Origin	APX
Scopes	`apx.validations:manage`, `apx.validations:redeem`
Request body	ValidationVoid

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`issuanceId`	path	yes	string uuid	

Response	Body	Meaning
200	ValidationIssuance	The voided issuance.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program or issuance, or another provider's under a `redeem` token (`target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.9 POST /v1/validations/instruments/{code}/void

Void a single validation code. Transition one instrument `valid` or `expired → void` (Part 20 §20.2 rule 5) — a single leaked code. A `redeemed` code cannot be voided (422 `instrument-invalid`; reverse the redemption first). Voiding a code already `void` returns it unchanged (200). As on the read, a code outside the caller's grant or provider is 404, never 403.

Item	Value
Operation id	`post-apx-v1-validations-instruments-code-void`
Origin	APX
Scopes	`apx.validations:manage`, `apx.validations:redeem`
Request body	ValidationVoid

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Parameter	In	Required	Type	Description
`code`	path	yes	string	

Response	Body	Meaning
200	ValidationInstrument	The voided instrument.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	Unknown code (or outside the caller's grant or provider).
422	Problem	The code is already `redeemed` (`instrument-invalid`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.10 GET /v1/validations/redemptions

List/filter redemptions. Filter by program, place, ticket, session, the Part 6 command that applied it, channel, status, and `since` (appliedTime). A `redeem` token sees only its own provider's redemptions (§20.5).

Item	Value
Operation id	`get-apx-v1-validations-redemptions`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`program`	query	no	string uuid	
`command`	query	no	string uuid	The `applyValidation` Command (Part 6 §6.3) whose redemption to find — matches `ValidationRedemption.command`.
`place`	query	no	string uuid	
`ticket`	query	no	string	
`session`	query	no	string uuid	
`channel`	query	no	string (lane, payStation, merchantApp, callCenter, api)	
`status`	query	no	string (applied, reversed)	
`since`	query	no	string date-time	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated redemptions (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).

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Response	Body	Meaning
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.11 POST /v1/validations/redemptions

Record a redemption (idempotent). Applies a validation to a ticket/session from a pay station, merchant app, or lane device — the data-plane counterpart of the Part 6 `applyValidation` command (which agents use to act on a lane; it materializes the same resource). `Idempotency-Key` REQUIRED. The server evaluates the program rules (Part 20 §20.3): 422 `program-not-active`, `request-unprocessable` (the body's `place` is not the program's place or within its subtree), `instrument-invalid`, `redemption-limit-exceeded`. On success the session gains the APDS `Segment.validationId` and `amountReduced` reflects the ACTUAL reduction. Publishes `apx.validations.redeemed.v1`.

Item	Value
Operation id	`post-apx-v1-validations-redemptions`
Origin	APX
Scopes	`apx.validations:manage`, `apx.validations:redeem`
Request body	ValidationRedemption

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ValidationRedemption	Idempotent replay — same key + same body returns the redemption's current representation (Part 4 §4.2a).
201	ValidationRedemption	Redemption applied.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	In §20.3 order: `program-not-active` (program not `active`); `request-unprocessable` (place mismatch — `detail` names the program's place); `instrument-invalid` (unknown, void, expired, or used code, or a required instrument absent); `redemption-limit-exceeded` (a program rule refuses it); `reference-unknown` (a body Reference names nothing visible).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.12 GET /v1/validations/redemptions/{id}

Read a redemption. Returns the redemption including any reversal and the immutable statusHistory. Another provider's redemption under a `redeem` token is 404 (Part 9 §9.3a rule 2).

Item	Value
Operation id	`get-apx-v1-validations-redemptions-id`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`

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Item	Value
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValidationRedemption	The redemption.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such redemption, or another provider's under a `redeem` token (`target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.13 POST /v1/validations/redemptions/{id}/reverse

Reverse a redemption. Transition `applied → reversed`; the amount due on the session is restored while the session is still open (Part 20 §20.4), and the instrument (if any) returns to `valid` while still within its window. Already reversed is 409 `redemption-reversed`. A redemption already billed on a CLOSED statement is reversed too: the closed statement is never edited; `reversal.closedStatement` names it, and the next statement closed for the program carries a negative `credit` line (`reversal.creditedOn` is set when it closes, §20.6).

Item	Value
Operation id	`post-apx-v1-validations-redemptions-id-reverse`
Origin	APX
Scopes	`apx.validations:manage`
Request body	ValidationRedemptionReversal

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValidationRedemption	Reversed redemption.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such redemption.
409	Problem	Already reversed (`redemption-reversed`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.14 GET /v1/validations/programs/{id}/statement

Preview a billing statement for a period. Computes the program's redemptions and billable total for `from`..`to` under its billing model — a preview (`statementStatus: preview`, no `id`), including the `credit` lines the period would carry. Closing the period is `POST …/statements`. `from` not before `to` is 400 `invalid-request`.

Item	Value
Operation id	`get-apx-v1-validations-programs-id-statement`
Origin	APX

Item	Value
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`from`	query	yes	string date-time	
`to`	query	yes	string date-time	

Response	Body	Meaning
200	ValidationStatement	The computed statement.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.15 GET /v1/validations/programs/{id}/statements

List closed statements for a program. Closed statements, newest period first; `lines[]` omitted.

Item	Value
Operation id	`get-apx-v1-validations-programs-id-statements`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated statements (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program, or (`mode=change`) a refused cursor (`target-not-found`; Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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3.4.16 POST /v1/validations/programs/{id}/statements

Close a billing period (idempotent). Freezes the period into an immutable statement the operator's accounting invoices from. `Idempotency-Key` REQUIRED. Periods MUST NOT overlap an existing closed statement (409 `statement-overlap`). The statement carries a negative `credit` line for every redemption reversed since an earlier statement billed it, and sets `reversal.creditedOn` on each (Part 20 §20.6). Publishes `apx.validations.statement.closed.v1`.

Item	Value
Operation id	`post-apx-v1-validations-programs-id-statements`
Origin	APX
Scopes	`apx.validations:manage`
Request body	ValidationStatementClose

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ValidationStatement	Idempotent replay — same key + same body returns the statement (Part 4 §4.2a; a closed statement never changes).
201	ValidationStatement	Period closed.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`), or a period whose `periodStart` is not before `periodEnd` or a body that fails the schema (`invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such program.
409	Problem	Overlaps a closed statement, or Idempotency-Key replayed with a different body.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.4.17 GET /v1/validations/statements/{id}

Read a closed statement. The immutable statement with `lines[]`. Another provider's statement under a `redeem` token is 404 (Part 9 §9.3a rule 2).

Item	Value
Operation id	`get-apx-v1-validations-statements-id`
Origin	APX
Scopes	`apx.validations:read`, `apx.validations:redeem`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValidationStatement	The statement.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such statement, or another provider's under a `redeem` token (`target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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3.5 Tolling

Toll transactions, a net-new domain: APDS has no toll entity.

Method	Path	Summary	Scopes
GET	`/v1/tolling/transactions`	List/filter toll transactions	`apx.tolling:manage`
POST	`/v1/tolling/transactions`	Create a toll transaction (idempotent)	`apx.tolling:manage`
GET	`/v1/tolling/transactions/{id}`	Read a toll transaction	`apx.tolling:manage`
POST	`/v1/tolling/transactions/{id}/payment`	Attach the settling Payment reference	`apx.tolling:manage`
POST	`/v1/tolling/transactions/{id}/price`	Price a created toll transaction	`apx.tolling:manage`
POST	`/v1/tolling/transactions/{id}/void`	Void a toll transaction	`apx.tolling:manage`
POST	`/v1/tolling/transactions/{id}/disputes`	Open a dispute	`apx.tolling:manage`
POST	`/v1/tolling/transactions/{id}/disputes/resolve`	Resolve a dispute	`apx.tolling:manage`

3.5.1 GET /v1/tolling/transactions

List/filter toll transactions. Filter by plate or credential, status, toll point, place, and time window; all filters combine with AND (Part 15 §15.2). Results are constrained to the caller's grant.

Item	Value
Operation id	`get-apx-v1-tolling-transactions`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`plate`	query	no	string	Convenience alias for `credentialType=licensePlate&credentialIdentification=<plate>`.
`status`	query	no	string	A `transactionStatus` value. A value outside that enum is 400 `invalid-request`, never an empty list.
`tollPoint`	query	no	string uuid	The toll point (SupplementalEquipment id) that produced the transaction.
`place`	query	no	array of string	Comma-separated HierarchyElement ids, subtree-inclusive. A place outside the caller's grant is 403 `insufficient-grant`.
`credentialType`	query	no	string	Matches `credential.credentialType` (an APDS CredentialTypeEnum value, e.g. `rfid`).
`credentialIdentification`	query	no	string	Matches `credential.credentialIdentification` exactly (a plate string or tag id).
`since`	query	no	string date-time	Only transactions created at or after this instant (`statusHistory[0].time`), RFC 3339.

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Parameter	In	Required	Type	Description
`until`	query	no	string date-time	Only transactions created before this instant (`statusHistory[0].time`), RFC 3339.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Matching transactions; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.2 POST /v1/tolling/transactions

Create a toll transaction (idempotent). Binds Observation refs + credential + pricing. Idempotency-Key REQUIRED. Created `priced` when `pricing` is given, otherwise `created` (priced later via `POST …/{id}/price`; Part 15 §15.1).

Item	Value
Operation id	`post-apx-v1-tolling-transactions`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollTransaction

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	TollTransaction	Idempotent replay — same key + same body returns the transaction the key created, in its current representation (`version` and `transactionStatus` may have advanced; Part 4 §4.2a).
201	TollTransaction	Created toll transaction.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema, e.g. no `tollPoint` (`invalid-request`, Part 12).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.3 GET /v1/tolling/transactions/{id}

Read a toll transaction. Includes dispute state and the immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-tolling-transactions-id`
Origin	APX

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Item	Value
Scopes	`apx.tolling:manage`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	TollTransaction	The transaction.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such transaction.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.4 POST /v1/tolling/transactions/{id}/payment

Attach the settling Payment reference. Transitions the transaction to paid. Allowed from `priced`, and from `resolved` with resolution `upheld` or `adjusted` on an unpaid transaction; anything else is 409 `toll-transition-illegal` (Part 15 §15.1). Re-attaching the payment already attached returns 200 unchanged, so a replayed billing batch is harmless. Idempotency-Key optional (Part 4 §4.2a).

Item	Value
Operation id	`post-apx-v1-tolling-transactions-id-payment`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollPaymentAttachment

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	TollTransaction	Paid transaction.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such transaction.
409	Problem	The transaction's state does not accept a payment (`created`, `disputed`, `voided`, `resolved` as `refunded` or already paid, or `paid` with a different payment — `toll-transition-illegal`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.5 POST /v1/tolling/transactions/{id}/price

Price a created toll transaction. For pricing engines outside the APX server: sets `pricing` on a `created` transaction and moves it to `priced` (Part 15 §15.1). From any other state 409 `toll-transition-illegal`; a later

price change goes through a dispute. Idempotency-Key optional.

Item	Value
Operation id	`post-apx-v1-tolling-transactions-id-price`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollPricing

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	TollTransaction	The transaction, now `priced`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Not `created` (`toll-transition-illegal`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.6 POST /v1/tolling/transactions/{id}/void

Void a toll transaction. Terminal: the charge should never have been raised (a duplicate, an exempt service vehicle, a misread). Allowed from `created` and `priced` only; a paid charge is corrected by a dispute resolved `refunded`, so `paid`, `disputed`, `resolved`, and `voided` are 409 `toll-transition-illegal` (Part 15 §15.1). Idempotency-Key optional.

Item	Value
Operation id	`post-apx-v1-tolling-transactions-id-void`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollVoid

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	TollTransaction	The transaction, now `voided`.

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Response	Body	Meaning
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Not `created` or `priced` (`toll-transition-illegal`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.7 POST /v1/tolling/transactions/{id}/disputes

Open a dispute. Opened by the operator, on the holder's behalf or on its own initiative (Part 15 §15.1). Allowed from `priced` and `paid`. Re-disputing a `resolved` transaction is 409 `dispute-closed`; a `created`, `voided`, or already `disputed` transaction is 409 `toll-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-tolling-transactions-id-disputes`
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollDisputeOpen

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	TollTransaction	Disputed transaction.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	The dispute is already resolved (`dispute-closed`), or the transaction's state does not allow a dispute (`toll-transition-illegal`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

3.5.8 POST /v1/tolling/transactions/{id}/disputes/resolve

Resolve a dispute. Allowed from `disputed` only. Base resolution values upheld | refunded | adjusted | withdrawn (Part 15 §15.1); `adjusted` carries `adjustedPricing`, which replaces `pricing` (the old amount moves to `dispute.originalPricing`).

Item	Value
Operation id	`post-apx-v1-tolling-transactions-id-disputes-resolve`

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Item	Value
Origin	APX
Scopes	`apx.tolling:manage`
Request body	TollDisputeResolution

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	TollTransaction	Resolved transaction.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	No open dispute: the dispute is already resolved (`dispute-closed`), or the transaction was never disputed (`toll-transition-illegal`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4 Vehicles and access

4.1 LPR

Plates. A camera read *is* an APDS `Observation`, so ingest is the standard data route every integration already uses. No bespoke ingestion API.

Method	Path	Summary	Scopes
GET	`/v1/lpr/reads/{observation}`	Read back one ingested LPR read by its Observation id	`apx.lpr:read`
PUT	`/v1/lpr/reads/{observation}/plate`	A reviewer confirms, corrects, or rejects a read's plate	`apx.data:write`
POST	`/v1/lpr/reads:search`	The reads lookup with the plate in a body, never a URL	`apx.lpr:read`
PUT	`/v1/sessions/{id}/plate`	Associate or correct the plate on a session	`apx.data:write`
GET	`/v1/lpr/reads`	Bidirectional plate/ticket cross-lookup	`apx.lpr:read`
PUT	`/v1/lpr/reads/{observation}/access-event`	Revise a read's access event	`apx.data:write`
GET	`/v1/lpr/candidates`	Plate candidates for correction workflows	`apx.lpr:read`

4.1.1 GET /v1/lpr/reads/{observation}

Read back one ingested LPR read by its Observation id. One `LprRead` for the Observation (Part 13 §13.3). The same projection as `GET /v1/lpr/reads?observation=`, addressed by path like the revision routes. A read at a place outside the caller's `apx_places` grant is 403 `insufficient-grant`; an unknown or purged read is 404 `target-not-found` (§13.3b).

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Item	Value
Operation id	`get-apx-v1-lpr-reads-observation`
Origin	APX
Scopes	`apx.lpr:read`
Request body	—

Parameter	In	Required	Type	Description
`observation`	path	yes	string uuid	

Response	Body	Meaning
200	LprRead	The read.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.1.2 PUT /v1/lpr/reads/{observation}/plate

A reviewer confirms, corrects, or rejects a read's plate. Read-level plate review (Part 13 §13.3a(4a)), the counterpart of the access-event revision: a reviewer's decision on one read, before any Session exists and however many Sessions the read feeds. `corrected` writes the winning values into the Observation's `observedCredentialId` and `vehicleAncillaryIdentification` and into `detail.plate`, `.country`, `.stateProvince`, keeping the engine's values, with their confidences, in `detail.review.original` — set on the first correction and never changed afterwards. Every decision that changes the read sets `detail.review`, increments the Observation `version`, and publishes `apx.data.observation.updated.v1`. Resending the decision and values the read already has is a no-op: 200 with the current `version`, no new version, no event. `If-Match` carries the Observation `version` last read (409 `version-conflict` when stale; nothing is written). `corrected` without `plate`, or `plate`, `country`, or `stateProvince` with any other decision, is 422 `request-unprocessable`. A `pending` or `rejected` read is not issuable evidence (Part 19 §19.4 rule 6). The write changes no Session.

Item	Value
Operation id	`put-apx-v1-lpr-reads-observation-plate`
Origin	APX
Scopes	`apx.data:write`
Request body	PlateCorrection

Parameter	In	Required	Type	Description
`observation`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	LprRead / object	The read after the decision.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.

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Response	Body	Meaning
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	`If-Match` names a stale Observation version (`version-conflict`); nothing is written.
422	Problem	`corrected` without a `plate`, or `plate`, `country`, or `stateProvince` sent with another decision (`request-unprocessable`); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.1.3 POST /v1/lpr/reads:search

The reads lookup with the plate in a body, never a URL. The same lookup as `GET /v1/lpr/reads`, with the keys in the body so a plate never enters a URL that proxies, gateways, and access logs keep (Part 9 §9.6; Part 13 §13.3). Same rules, grant behaviour, and response. The `GET` keeps working; a deployment that crosses a network boundary SHOULD use this form.

Item	Value
Operation id	`post-apx-v1-lpr-reads-search`
Origin	APX
Scopes	`apx.lpr:read`
Request body	LprReadSearch

Response	Body	Meaning
200	object	Matching reads.
400	Problem	None of `plate`, `ticket`, `observation`, or `session` given (`invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.1.4 PUT /v1/sessions/{id}/plate

Associate or correct the plate on a session. The write side of plate correction (Part 17 §17.5): sets the session's plate, optionally citing the chosen Observation candidate (GET /v1/lpr/candidates). A transactional domain action — not a control command. Naturally idempotent (PUT). Scope apx.data:write.

Item	Value
Operation id	`put-apx-v1-sessions-id-plate`
Origin	APX
Scopes	`apx.data:write`
Request body	object

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	APDS Session UUID.
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

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Response	Body	Meaning
200	object	The corrected association.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such session.
409	Problem	`If-Match` names a stale Session version (`version-conflict`, Part 4 §4.2a); nothing is written.
422	Problem	The Session is closed and outside the operator's dispute window, or closed and the correction carries no `reason` (`session-not-open`, Part 17 §17.5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.1.5 GET /v1/lpr/reads

Bidirectional plate/ticket cross-lookup. plate → ticket/session with accuracy + screenshot; ticket → plate; Session → the reads behind it. A pure profile over APDS Observations (ingest = native POST /observations). Where the ingested Observation carried the `apds-ext:apx:lpr-read@1.0` decoration, each read returns `detail` (per-attribute confidences for plate, state, make, model, color, class; alternate reads; passage geometry; and `accessEvent` — entry or exit — as the LPR system reported it; Part 13 §13.3a).

Item	Value
Operation id	`get-apx-v1-lpr-reads`
Origin	APX
Scopes	`apx.lpr:read`
Request body	—

Parameter	In	Required	Type	Description
`plate`	query	no	string	
`ticket`	query	no	string	
`observation`	query	no	string uuid	Lookup by the underlying APDS Observation id. Returns the LprRead projection of one ingested read; the stored ObservationElement itself is native GET /observations/{id}.
`session`	query	no	string uuid	The reads behind one APDS Session — its entry and exit reads and every read of their passages (Part 13 §13.3a(6)). A Session at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` (Part 13 §13.5(4)).
`place`	query	no	string uuid	Narrow results below the grant to one HierarchyElement and its subtree (Part 13 §13.5(3)). A place outside the caller's `apx_places` grant is 403 `insufficient-grant`. Servers that do not narrow MAY ignore it.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Matching reads.
400	Problem	None of `plate`, `ticket`, `observation`, or `session` given (problem type `invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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4.1.6 PUT /v1/lpr/reads/{observation}/access-event

Revise a read's access event. The LPR system's revision of `accessEvent` on a read it ingested (Part 13 §13.3a(4)) — for example after pairing the reads of one `captureGroup`, or an entry read with an exit read. APDS 4.1 has no route that replaces one Observation, so this is the revision route.

Item	Value
Operation id	`put-apx-v1-lpr-reads-observation-access-event`
Origin	APX
Scopes	`apx.data:write`
Request body	object

Parameter	In	Required	Type	Description
`observation`	path	yes	string uuid	The APDS Observation id of the read.
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	object	The read's access event as it now stands.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such LPR read (`target-not-found`).
409	Problem	`If-Match` names a stale Observation version (`version-conflict`, Part 4 §4.2a); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.1.7 GET /v1/lpr/candidates

Plate candidates for correction workflows. Candidate plate reads (with confidence and imagery links) for a session or lane — the read side of plate correction (Part 17 §17.5); the write is PUT /v1/sessions/{id}/plate. Scope apx.lpr:read.

Item	Value
Operation id	`get-apx-v1-lpr-candidates`
Origin	APX
Scopes	`apx.lpr:read`
Request body	—

Parameter	In	Required	Type	Description
`session`	query	no	string uuid	Session UUID.
`lane`	query	no	string uuid	VehicularAccess UUID.
`since`	query	no	string date-time	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Candidates, best confidence first.
400	Problem	Neither session nor lane given (problem type `invalid-request`).

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Response	Body	Meaning
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2 Credentials

The card, the fob, the tag, the phone. The lifecycle of anything presented at a lane: issue, activate, suspend, resume, report lost, revoke, replace, plus access-event history.

Method	Path	Summary	Scopes
GET	`/v1/credentials`	List/filter credentials	`apx.credentials:read`
POST	`/v1/credentials`	Issue a credential (idempotent)	`apx.credentials:manage`
GET	`/v1/credentials/{id}`	Read a credential	`apx.credentials:read`
POST	`/v1/credentials/{id}/activate`	Activate a credential	`apx.credentials:manage`
POST	`/v1/credentials/{id}/suspend`	Suspend a credential	`apx.credentials:manage`
POST	`/v1/credentials/{id}/resume`	Resume a suspended credential	`apx.credentials:manage`
POST	`/v1/credentials/{id}/report-lost`	Report a credential lost or stolen	`apx.credentials:manage`
POST	`/v1/credentials/{id}/revoke`	Revoke a credential (terminal)	`apx.credentials:manage`
POST	`/v1/credentials/{id}/replace`	Replace a credential with a successor (idempotent)	`apx.credentials:manage`
GET	`/v1/credentials/{id}/access-events`	Access-event history for a credential	`apx.credentials:read`
GET	`/v1/access-events`	Access events by place, lane, or reader	`apx.credentials:read`

4.2.1 GET /v1/credentials

List/filter credentials. Filter by holder, account, type, identification, status, and place (subtree-inclusive). Results are constrained to the caller's place grant; identification values are personal data under Part 9 §9.6. A lookup by `identification` that matches only records outside the grant returns an empty 200 (Part 9 §9.3a).

Item	Value
Operation id	`get-apx-v1-credentials`
Origin	APX
Scopes	`apx.credentials:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`holder`	query	no	string uuid	
`account`	query	no	string uuid	
`type`	query	no	CredentialTypeEnum	
`identification`	query	no	string	

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Parameter	In	Required	Type	Description
`status`	query	no	string (issued, active, suspended, lost, revoked, expired, replaced)	
`place`	query	no	string uuid	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated credentials (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.2 POST /v1/credentials

Issue a credential (idempotent). Creates a CredentialRecord in `issued`. It becomes `active` either by a later `activate` call or, when the body sets `activateOnStart: true`, by the server itself at `validity.start` (at once when that is absent or past), with actor `system` (Part 21 §21.1 rule 6). `Idempotency-Key` REQUIRED. `credentialIdentification` MUST be unique per `credentialType` among non-terminal records (409 `credential-identification-in-use`, whose `detail` MUST NOT identify the holding record, holder, or place — §21.5). Server-assigned members in the body (`id`, `version`, `credentialStatus`, `suspension`, `replacedBy`, `statusHistory`, `recordInfo`) are ignored. Publishes `apx.credentials.status.v1`.

Item	Value
Operation id	`post-apx-v1-credentials`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialRecord

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	CredentialRecord	Idempotent replay — same key + same body returns the record as it stands now (Part 4 §4.2a).
201	CredentialRecord	Credential issued.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a record that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Identification already in use for this type (`credential-identification-in-use`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
422	Problem	Unknown holder, account, assigned right, or place (`reference-unknown`); or a validity window that is already over or inverted — `validity.end` not in the future, or before `validity.start` (`request-unprocessable`, Part 21 §21.1 rule 7).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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4.2.3 GET /v1/credentials/{id}

Read a credential. Returns the record including media, replacement links, and the immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-credentials-id`
Origin	APX
Scopes	`apx.credentials:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	The credential.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.4 POST /v1/credentials/{id}/activate

Activate a credential. Transition `issued → active`; materializes the APDS CredentialAssigned (§21.2). Any other state is 409 `credential-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-credentials-id-activate`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	Active credential.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.5 POST /v1/credentials/{id}/suspend

Suspend a credential. Transition `active → suspended` (optionally `until`, which MUST be in the future — else 422 `request-unprocessable`); the lane MUST deny it meanwhile. Any other state is 409 `credential-transition-illegal`.

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Item	Value
Operation id	`post-apx-v1-credentials-id-suspend`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	Suspended credential.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Illegal transition.
422	Problem	`until` is not in the future (`request-unprocessable`, Part 21 §21.1 rule 7); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.6 POST /v1/credentials/{id}/resume

Resume a suspended credential. Transition `suspended → active`. Any other state is 409 `credential-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-credentials-id-resume`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	Active credential.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.7 POST /v1/credentials/{id}/report-lost

Report a credential lost or stolen. Transition `active | suspended → lost`; the lane MUST deny it from this instant. Follow with `replace` or `revoke`. Any other state is 409 `credential-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-credentials-id-report-lost`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	Credential marked lost.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.8 POST /v1/credentials/{id}/revoke

Revoke a credential (terminal). Transition `issued | active | suspended | lost → revoked`; removes the APDS CredentialAssigned. Terminal states are 409 `credential-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-credentials-id-revoke`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialTransition

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	CredentialRecord	Revoked credential.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.9 POST /v1/credentials/{id}/replace

Replace a credential with a successor (idempotent). Issues a successor `active` record inheriting holder, account, assigned rights, places, and validity; links `replaces`/`replacedBy`; moves THIS record to `replaced` and swaps the APDS CredentialAssigned atomically. The predecessor keeps every other field it had (§21.3). Allowed

from `active`, `suspended`, or `lost`. From `issued` it is 409 `credential-transition-illegal` (revoke it and issue anew); `credential-not-replaceable` is reserved for the terminal states `revoked`, `expired`, `replaced`. `Idempotency-Key` REQUIRED. Returns the successor.

Item	Value
Operation id	`post-apx-v1-credentials-id-replace`
Origin	APX
Scopes	`apx.credentials:manage`
Request body	CredentialReplaceRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	CredentialRecord	Idempotent replay — returns the successor as it stands now (Part 4 §4.2a).
201	CredentialRecord	The successor credential.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
409	Problem	Terminal record (`credential-not-replaceable`), a record still `issued` (`credential-transition-illegal`), successor identification in use (`credential-identification-in-use`), or key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.10 GET /v1/credentials/{id}/access-events

Access-event history for a credential. Entry/exit attempts with this credential, newest first — granted or denied, where, and why. The same events are published as `apx.credentials.access.v1`. Retention per Part 9 §9.6.

Item	Value
Operation id	`get-apx-v1-credentials-id-access-events`
Origin	APX
Scopes	`apx.credentials:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`since`	query	no	string date-time	
`until`	query	no	string date-time	Exclusive upper bound on `occurredAt`.
`outcome`	query	no	string (granted, denied)	
`direction`	query	no	string (entry, exit)	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated access events (APDS PaginatedList shape).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.2.11 GET /v1/access-events

Access events by place, lane, or reader. Every access attempt at the caller's granted places, newest first — including presentations that matched no CredentialRecord (`denialReason: unknownCredential`, carrying `presented`). "Every denial at lane 1 tonight" is `?lane=…&outcome=denied&since=…`. Results are constrained to the caller's place grant; naming a place, lane, or device outside it is 403 `insufficient-grant` (Part 9 §9.3a). Retention per Part 9 §9.6. The same events are published as `apx.credentials.access.v1` (Part 21 §21.4).

Item	Value
Operation id	`get-apx-v1-access-events`
Origin	APX
Scopes	`apx.credentials:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	array of string	HierarchyElement ids, comma-separated; subtree-inclusive.
`lane`	query	no	string uuid	The VehicularAccess.
`device`	query	no	string uuid	The reader (SupplementalEquipment).
`credential`	query	no	string uuid	A CredentialRecord id.
`outcome`	query	no	string (granted, denied)	
`denialReason`	query	no	string	definedValue from `apx-access-denial-reasons` (or an implementer code list).
`direction`	query	no	string (entry, exit)	
`since`	query	no	string date-time	Inclusive lower bound on `occurredAt`.
`until`	query	no	string date-time	Exclusive upper bound on `occurredAt`.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated access events (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3 Valet

Custody. A net-new domain: APDS has no valet entity, only a restriction flag.

Method	Path	Summary	Scopes
GET	`/v1/valet/tickets`	List/filter valet tickets	`apx.valet:read`
POST	`/v1/valet/tickets`	Take custody of a vehicle (drop-off, idempotent)	`apx.valet:manage`
GET	`/v1/valet/queue`	The retrieval queue for a place (attendant board)	`apx.valet:read`
GET	`/v1/valet/tickets/{id}`	Read a valet ticket	`apx.valet:read` `apx.valet:request`
POST	`/v1/valet/tickets/{id}/park`	Record the parked position and key location	`apx.valet:manage`
POST	`/v1/valet/tickets/{id}/retrieve`	Request the vehicle (now or scheduled)	`apx.valet:manage` `apx.valet:request`
POST	`/v1/valet/tickets/{id}/cancel-retrieval`	Cancel an open retrieval request	`apx.valet:manage` `apx.valet:request`
POST	`/v1/valet/tickets/{id}/stage`	Vehicle at the staging lane	`apx.valet:manage`
POST	`/v1/valet/tickets/{id}/handback`	Hand the vehicle to a verified customer	`apx.valet:manage`
POST	`/v1/valet/tickets/{id}/pickup`	A runner has gone for the car	`apx.valet:manage`
POST	`/v1/valet/tickets/{id}/cancel`	Abandon a drop-off before custody (terminal)	`apx.valet:manage`
POST	`/v1/valet/tickets/{id}/condition`	Append a condition-report correction	`apx.valet:manage`

4.3.1 GET /v1/valet/tickets

List/filter valet tickets. Filter by place (subtree-inclusive), status, plate, ticket number, customer account, and `since` (dropOff.time).

Item	Value
Operation id	`get-apx-v1-valet-tickets`
Origin	APX
Scopes	`apx.valet:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).

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Parameter	In	Required	Type	Description
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	
`status`	query	no	string (dropped, parked, requested, retrieving, staged, handedBack, closed, cancelled)	
`plate`	query	no	string	
`ticketNumber`	query	no	string	
`account`	query	no	string uuid	
`since`	query	no	string date-time	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated tickets (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.2 POST /v1/valet/tickets

Take custody of a vehicle (drop-off, idempotent). Creates the ValetTicket in `dropped` with the drop-off condition report. `Idempotency-Key` REQUIRED (handhelds and scanning devices retry). The server SHOULD open the APDS Session for the stay and reference it, unless the body already references one. `storage`, `retrieval`, `handback`, `statusHistory`, and `recordInfo` in the body are ignored — the server writes them (Part 22 §22.1 rule 5). A `customer.contactChannel.handle` that carries a raw phone number or e-mail address SHOULD be refused with 422 `personal-data-not-permitted` rather than stored or silently masked (§22.6). Publishes `apx.valet.ticket.status.v1`.

Item	Value
Operation id	`post-apx-v1-valet-tickets`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetTicket

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ValetTicket	Idempotent replay — same key + same body returns the ticket as it stands now (Part 4 §4.2a).
201	ValetTicket	Custody taken.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a ticket that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

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Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body (`idempotency-conflict`).
422	Problem	Unknown place, lane, session, or customer reference (`reference-unknown`), or a raw phone number or e-mail address where an opaque handle is required (`personal-data-not-permitted`, §22.6).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.3 GET /v1/valet/queue

The retrieval queue for a place (attendant board). Tickets in `requested`, `retrieving`, or `staged` at the place, ordered by `retrieval.promisedTime` ascending — what the runners and the stand see. Scheduled pickups (`requestedFor`) appear when they fall inside `horizonMinutes` (default 60).

Item	Value
Operation id	`get-apx-v1-valet-queue`
Origin	APX
Scopes	`apx.valet:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	yes	string uuid	
`horizonMinutes`	query	no	integer	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	The queue (APDS PaginatedList shape).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.4 GET /v1/valet/tickets/{id}

Read a valet ticket. Full record for operator scopes. A `apx.valet:request` token sees only its own ticket, as the minimized projection of Part 22 §22.5 — `id`, `version`, `place`, `ticketNumber`, `vehicle`, `customer.displayName`, `dropOff.time`, `retrieval.{requestedTime, requestedFor, channel, etaMinutes, promisedTime, stagingLane, stagedTime, cancelledTime}`, `handback.time`, `valetStatus`, and `extensions`; everything else, including `statusHistory`, is omitted. The same projection applies to the ticket a `apx.valet:request` token gets back from `retrieve` and `cancel-retrieval`. An operator token gets 403 `insufficient-grant` for a ticket at a place outside its grant (Part 9 §9.3a).

Item	Value
Operation id	`get-apx-v1-valet-tickets-id`
Origin	APX
Scopes	`apx.valet:read`, `apx.valet:request`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

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Response	Body	Meaning
200	ValetTicket	The ticket.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such ticket, or — for an `apx.valet:request` token — a ticket it is not bound to (`target-not-found`; existence is never disclosed, Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.5 POST /v1/valet/tickets/{id}/park

Record the parked position and key location. Transition `dropped → parked`; update `storage` while `parked`; or re-park a `staged` car the customer is not collecting yet (`staged → parked`: records the new `storage`, clears `retrieval.stagingLane`/`stagedTime`, and sets `retrieval.cancelledTime` and `cancelReason: re-parked`). Any other state is 409 `valet-transition-illegal`. Send `If-Match` with the version last read so two runners cannot overwrite each other's `storage`: a stale value is 409 `version-conflict` (Part 4 §4.2a); without it the write is last-writer-wins.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-park`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetParkRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	ValetTicket	Parked ticket.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such ticket.
409	Problem	Illegal transition (`valet-transition-illegal`), or a stale `If-Match` (`version-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.6 POST /v1/valet/tickets/{id}/retrieve

Request the vehicle (now or scheduled). Transition `parked → requested`. The customer's text, app, web page, or voice bot calls this on `apx.valet:request` for its own ticket; attendants and the call center on `apx.valet:manage`. The server sets `retrieval.etaMinutes` and `promisedTime` and publishes `apx.valet.retrieval.requested.v1`. A repeat while `requested` or `retrieving` ("CAR" texted twice) is not an error: 200 with the current ticket and ETA, nothing appended or republished, and the body's `requestedFor` ignored (to reschedule, `cancel-retrieval` then `retrieve`). From `dropped` (not yet parked) it is 409 `valet-vehicle-not-located`; from `staged`, `handedBack`, `closed`, or `cancelled` it is 409 `valet-transition-illegal`.

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Item	Value
Operation id	`post-apx-v1-valet-tickets-id-retrieve`
Origin	APX
Scopes	`apx.valet:manage`, `apx.valet:request`
Request body	ValetRetrievalRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Requested ticket with ETA (or the unchanged ticket, for a repeat while `requested`/`retrieving`).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such ticket, or — for an `apx.valet:request` token — a ticket it is not bound to (`target-not-found`, Part 9 §9.3a). An operator token gets 403 `insufficient-grant` for a ticket outside its grant.
409	Problem	Vehicle not yet located, or illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.7 POST /v1/valet/tickets/{id}/cancel-retrieval

Cancel an open retrieval request. Transition `requested | retrieving → parked`. A staged car is re-parked by the operator with `park`, not cancelled here. Any other state is 409 `valet-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-cancel-retrieval`
Origin	APX
Scopes	`apx.valet:manage`, `apx.valet:request`
Request body	ValetCancelRetrievalRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Ticket back in `parked`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such ticket, or — for an `apx.valet:request` token — a ticket it is not bound to (`target-not-found`, Part 9 §9.3a). An operator token gets 403 `insufficient-grant` for a ticket outside its grant.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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4.3.8 POST /v1/valet/tickets/{id}/stage

Vehicle at the staging lane. Transition `requested | retrieving → staged`; sets `retrieval.stagingLane`/`stagedTime` and notifies the customer's contact channel. Any other state is 409 `valet-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-stage`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetStageRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Staged ticket.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such ticket.
409	Problem	Illegal transition.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.9 POST /v1/valet/tickets/{id}/handback

Hand the vehicle to a verified customer. Transition `staged → handedBack` (or `dropped → handedBack` before the car moved). The attendant verifies the claimant (`verificationMethod`) — a mismatch is 403 `valet-verification-failed` and MUST be recorded in `statusHistory`. Records the handback condition report. The APDS Session closes per the operator's flow; `closed` follows server-side when it settles.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-handback`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetHandbackRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Handed back.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope/grant, or claimant verification failed.
404	Problem	No such ticket.
409	Problem	Illegal transition.

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.10 POST /v1/valet/tickets/{id}/pickup

A runner has gone for the car. Transition `requested → retrieving`; sets `retrieval.retrievingBy` (the body's value, else the calling principal) — what the runner board shows as "on its way". Optional: `stage` from `requested` remains valid, and a server MAY infer `retrieving` from its own runner assignment instead (Part 22 §22.1 rule 2). Any other state is 409 `valet-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-pickup`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetPickupRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Ticket in `retrieving`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Illegal transition (`valet-transition-illegal`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.11 POST /v1/valet/tickets/{id}/cancel

Abandon a drop-off before custody (terminal). Transition `dropped → cancelled` — the driver left before the car moved, or the ticket was opened in error. Appends `statusHistory[]` and publishes `apx.valet.ticket.status.v1`; the server SHOULD close the APDS Session it opened at drop-off at no charge. A customer who changes their mind *after* the walk-around but takes the car back is `handback` from `dropped` instead. Any other state is 409 `valet-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-cancel`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ValetCancelRequest

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ValetTicket	Ticket `cancelled`.

Response	Body	Meaning
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Illegal transition (`valet-transition-illegal`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.3.12 POST /v1/valet/tickets/{id}/condition

Append a condition-report correction. Records a finding made after drop-off — the door ding a runner sees at P3 — without editing the drop-off report (Part 22 §22.2 rule 3). Each `damage[]` entry is appended to `dropOff.conditionReport.damage[]` stamped with a server-set `recordedTime` and `recordedBy` (the body's `recordedBy`, else the calling principal); `imageLinks[]` are appended to the report's `imageLinks[]`; `notes` becomes the `detail` of a new `statusHistory[]` entry whose `state` is the unchanged `valetStatus`. The report's original `notes`, `recordedTime`, `recordedBy`, and `customerAcknowledged` never change, and `customerAcknowledged` in the body is ignored. Legal in any state except `closed` and `cancelled` (409 `valet-transition-illegal`). Send `Idempotency-Key` when retrying: an append retried without one is appended twice.

Item	Value
Operation id	`post-apx-v1-valet-tickets-id-condition`
Origin	APX
Scopes	`apx.valet:manage`
Request body	ConditionReport

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	ValetTicket	The ticket with the correction appended (or, on an idempotent replay, the current ticket).
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Ticket `closed` or `cancelled` (`valet-transition-illegal`), or Idempotency-Key replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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4.4 Charging

Method	Path	Summary	Scopes
GET	`/v1/charging/points`	List live charging-point status for a place	`apx.charging:read` `apx.charging:status`
GET	`/v1/charging/points/{id}`	Read one charging point's live status	`apx.charging:read` `apx.charging:status`
PUT	`/v1/charging/points/{id}/status`	Bridge pushes the point's availability	`apx.charging:manage`
POST	`/v1/charging/points/{id}/bay`	Camera or sensor reports what is in the bay	`apx.charging:manage`
GET	`/v1/charging/sessions`	List/filter charging sessions	`apx.charging:read`
POST	`/v1/charging/sessions`	Open a charging session (authorization, idempotent)	`apx.charging:manage`
GET	`/v1/charging/sessions/{id}`	Read a charging session	`apx.charging:read` `apx.charging:status`
POST	`/v1/charging/sessions/{id}/events`	Bridge reports a physical-timeline event	`apx.charging:manage`
POST	`/v1/charging/sessions/{id}/payment`	Attach the settling payment or the network's CDR	`apx.charging:manage`

4.4.1 GET /v1/charging/points

List live charging-point status for a place. ChargingPointStatus for every ElectricChargingEquipment under the place (subtree-inclusive), optionally filtered by `availability` — "is there a free charger". A `apx.charging:status` token receives the minimized form (no `bay.vehicle`, no `bay.imageLink`, no `currentSession`; Part 23 §23.6).

Item	Value
Operation id	`get-apx-v1-charging-points`
Origin	APX
Scopes	`apx.charging:read`, `apx.charging:status`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	yes	string uuid	
`availability`	query	no	string (available, occupied, charging, reserved, blocked, inoperative, outOfOrder, unknown)	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Charging-point status list (APDS PaginatedList shape).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.2 GET /v1/charging/points/{id}

Read one charging point's live status. ChargingPointStatus keyed by the ElectricChargingEquipment id. Minimized for `apx.charging:status` (Part 23 §23.6).

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Item	Value
Operation id	`get-apx-v1-charging-points-id`
Origin	APX
Scopes	`apx.charging:read`, `apx.charging:status`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ChargingPointStatus	The status overlay.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such charging point (or outside the caller's grant).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.3 PUT /v1/charging/points/{id}/status

Bridge pushes the point's availability. The charging-network bridge (the operator's OCPP/OCPI integration) replaces the point-level and per-connector `availability`, `currentSession`, `reservedFor`, and `lastCommunication`. The `bay` block is NOT written here — it comes from `…/bay` and is fused by the server (Part 23 §23.3); a `bay` in this body is ignored. Publishes `apx.charging.point.status.v1` when availability changes.

Item	Value
Operation id	`put-apx-v1-charging-points-id-status`
Origin	APX
Scopes	`apx.charging:manage`
Request body	ChargingPointStatus

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ChargingPointStatus	The fused status after the update.
400	Problem	Body `chargingPoint` does not match the path id.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such charging point.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.4 POST /v1/charging/points/{id}/bay

Camera or sensor reports what is in the bay. An overhead-camera analytics system, ground sensor, or attendant reports the bay's physical presence: empty, vehicle plugged in, vehicle NOT plugged in, blocked. The server fuses it with the charger's connector state (Part 23 §23.3 table) into `ChargingPointStatus.bay` and derives `availability: blocked` when no cable is connected (a connected cable wins). A vehicle not plugged in past the place's grace SHOULD raise the proposed `evBayNotCharging` alert — or the seeded `iceInEvSpace` when `vehicle.evCapable` is false; an obstructed bay SHOULD raise the proposed `evBayBlocked` alert (Part 7; Part 23 §23.3). `Idempotency-Key` REQUIRED (cameras re-send).

Item	Value
Operation id	`post-apx-v1-charging-points-id-bay`
Origin	APX
Scopes	`apx.charging:manage`
Request body	ChargingBayPresence

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ChargingPointStatus	The fused status after the observation.
400	Problem	Missing Idempotency-Key or invalid observation.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such charging point.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.5 GET /v1/charging/sessions

List/filter charging sessions. Filter by place (subtree-inclusive), charging point, status, plate, parking session, account, and `since` (timeline.authorizedTime).

Item	Value
Operation id	`get-apx-v1-charging-sessions`
Origin	APX
Scopes	`apx.charging:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	
`chargingPoint`	query	no	string uuid	
`status`	query	no	string (authorized, pluggedIn, charging, suspended, complete, idle, unplugged, closed, cancelled, faulted)	
`plate`	query	no	string	
`parkingSession`	query	no	string uuid	
`account`	query	no	string uuid	
`since`	query	no	string date-time	
`page`	query	no	integer	The page number for paginated responses.

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Response	Body	Meaning
200	object	Paginated sessions (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.6 POST /v1/charging/sessions

Open a charging session (authorization, idempotent). Creates the ChargingSession in `authorized` with the authorization, the point and connector, the parking Session it belongs to, the settlement mode, and the idle policy snapshot; the plug-in itself arrives as a `pluggedIn` event (Part 23 §23.2). `Idempotency-Key` REQUIRED. 409 `charging-point-unavailable` when the point or connector is inoperative, out of order, reserved for someone else, or already serving an active session. Publishes `apx.charging.session.status.v1`.

Item	Value
Operation id	`post-apx-v1-charging-sessions`
Origin	APX
Scopes	`apx.charging:manage`
Request body	ChargingSession

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ChargingSession	Idempotent replay — same key + same body returns the ORIGINAL session.
201	ChargingSession	Session opened.
400	Problem	Missing Idempotency-Key or invalid session.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Point/connector unavailable, or Idempotency-Key replayed with a different body.
422	Problem	Unknown place, charging point, parking session, or credential reference; or `settlement.mode` parkingSession without `parkingSession`.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.7 GET /v1/charging/sessions/{id}

Read a charging session. Full record for operator scopes. A `apx.charging:status` token sees only its own session(s), minimized (Part 23 §23.6): status, energy and state of charge, timeline, idle policy and idle clock, cost totals, the point and connector — no plate, no credential or contract id, no network identifiers. Enough for "your car is at 62%, charging ends in about 40 minutes; 10 minutes grace, then $0.40 per minute".

Item	Value
Operation id	`get-apx-v1-charging-sessions-id`
Origin	APX
Scopes	`apx.charging:read`, `apx.charging:status`
Request body	—

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Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ChargingSession	The session.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such session (or outside the caller's grant).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.8 POST /v1/charging/sessions/{id}/events

Bridge reports a physical-timeline event. The APX counterpart of an OCPP 2.0.1 TransactionEvent. Applies the transition for `eventType` per Part 23 §23.2 — `pluggedIn`, `chargingStarted`, `suspended`/`resumed`, `chargingEnded`, `unplugged`, `fault`, `cancelled` — or, for `meterValue`, updates `energy` in place. Events MUST be applied in `time` order; one that is illegal from the current state is 409 `charging-transition-illegal` (a `meterValue` after `unplugged`, a `pluggedIn` after `charging`). `Idempotency-Key` REQUIRED. Every state change appends `statusHistory` and publishes `apx.charging.session.status.v1`; `complete → idle` is server-side after `idlePolicy.graceMinutes` and additionally publishes `apx.charging.idle.started.v1`.

Item	Value
Operation id	`post-apx-v1-charging-sessions-id-events`
Origin	APX
Scopes	`apx.charging:manage`
Request body	ChargingEvent

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	ChargingSession	The session after the event.
400	Problem	Missing Idempotency-Key or invalid event.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such session.
409	Problem	Illegal transition from the current state, or Idempotency-Key replayed with a different body.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

4.4.9 POST /v1/charging/sessions/{id}/payment

Attach the settling payment or the network's CDR. For `settlement.mode: directPayment`, attaches the settling Payment reference and moves an `unplugged` session to `closed`; before `unplugged` the final cost is unknown and it is 409 `charging-settlement-conflict`. For `chargingNetwork`, records the charge detail record id. For `parkingSession` it is 409 `charging-settlement-conflict` — that session closes when the APDS Session settles. Also 409 when the session is already `closed`.

Item	Value
Operation id	`post-apx-v1-charging-sessions-id-payment`
Origin	APX

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Item	Value
Scopes	`apx.charging:manage`
Request body	ChargingPaymentAttachment

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ChargingSession	The settled session.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such session.
409	Problem	Settlement mode does not take a payment here, session not yet unplugged, or already closed.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5 Enforcement and service

5.1 Violations

Enforcement, from camera to citation to appeal. A net-new domain, and the one with the most legal exposure.

Method	Path	Summary	Scopes
GET	`/v1/violations`	List/filter violations	`apx.violations:read`
POST	`/v1/violations`	Create a violation from a detection (idempotent)	`apx.violations:manage`
GET	`/v1/violations/{id}`	Read a violation	`apx.violations:read`
POST	`/v1/violations/{id}/review`	Review a detected candidate (guided enforcement)	`apx.violations:manage`
POST	`/v1/violations/{id}/issue`	Issue the notice or citation	`apx.violations:manage`
POST	`/v1/violations/{id}/payment`	Attach the settling Payment reference	`apx.violations:manage`
POST	`/v1/violations/{id}/appeals`	Open an appeal	`apx.violations:manage`
POST	`/v1/violations/{id}/appeals/resolve`	Resolve an appeal	`apx.violations:manage`
POST	`/v1/violations/{id}/void`	Void a violation	`apx.violations:manage`
GET	`/v1/enforcement/eligibility`	Is this vehicle entitled to be here right now?	`apx.violations:read`
GET	`/v1/enforcement/policies`	List enforcement policies	`apx.violations:read`
POST	`/v1/enforcement/policies`	Create an enforcement policy (idempotent)	`apx.violations:manage`
GET	`/v1/enforcement/policies/effective`	The policy in force at a place	`apx.violations:read`
GET	`/v1/enforcement/policies/{id}`	Read an enforcement policy	`apx.violations:read`
PUT	`/v1/enforcement/policies/{id}`	Update an enforcement policy (full update, versioned)	`apx.violations:manage`
GET	`/v1/enforcement/signage`	List signage records	`apx.violations:read`
POST	`/v1/enforcement/signage`	Record posted signage (idempotent)	`apx.violations:manage`
GET	`/v1/enforcement/signage/effective`	The signage in force at a place	`apx.violations:read`
GET	`/v1/enforcement/signage/{id}`	Read a signage record	`apx.violations:read`
PUT	`/v1/enforcement/signage/{id}`	Update a signage record (full update, versioned)	`apx.violations:manage`

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Method	Path	Summary	Scopes
POST	`/v1/violations:search`	The violations lookup with the plate in a body	`apx.violations:read`
POST	`/v1/enforcement/eligibility:check`	The eligibility check with the credential in a body	`apx.violations:read`
POST	`/v1/enforcement/violation-imports`	Import a violation an external enforcement system issued (idempotent)	`apx.violations:manage`
POST	`/v1/violations/{id}/session`	Set, correct, or clear the Session a violation relates to	`apx.violations:manage`

5.1.1 GET /v1/violations

List/filter violations. Filter by plate (credentialIdentification), notice number, status, type, place (subtree-inclusive), detection mode, the `since`..`until` window on detectedTime, and — for violations imported from another enforcement system (Part 19 §19.13) — the source system and the source's record id. Results are constrained to the caller's place grant; a lookup that names no place (by plate or notice number) returns only violations at granted places (Part 9 §9.3a). Plate values appear only under `apx.violations:*` scopes (Part 9 §9.6).

Item	Value
Operation id	`get-apx-v1-violations`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`plate`	query	no	string	
`noticeNumber`	query	no	string	Exact match on `notice.noticeNumber` — the number the driver holds, and the payment `reference` (§19.6).
`status`	query	no	string (detected, confirmed, dismissed, issued, paid, appealed, closed, voided)	
`type`	query	no	string	
`place`	query	no	string uuid	
`detectionMode`	query	no	string (automated, guided, manual)	
`since`	query	no	string date-time	
`until`	query	no	string date-time	Upper bound (exclusive) on `detection.detectedTime`.
`sourceSystem`	query	no	string	Imported violations from this source system only (`system` of `apds-ext:apx:violation-source@1.0`, Part 19 §19.13).
`sourceRecordId`	query	no	string	Exact match on the source's record id (`recordId`); like `noticeNumber`, it names no place (Part 9 §9.3a rule 3).
`page`	query	no	integer	The page number for paginated responses.

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Response	Body	Meaning
200	object	Paginated violations (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.2 POST /v1/violations

Create a violation from a detection (idempotent). Records a detected violation — from an automated camera/sensor pipeline, a guided-enforcement handheld, or an officer directly (`detection.mode`). The `Idempotency-Key` header is REQUIRED: cameras and handhelds retry, and a retry must not create a second violation. Same key + same body returns the violation's current representation (200, Part 4 §4.2a); same key + different body is 409 idempotency-conflict. The server performs the eligibility check at creation and records it in `eligibilityCheck`; a vehicle found entitled is still recorded (as `dismissed`, with the basis) so the audit trail is complete. Publishes `apx.violations.detected.v1`.

Item	Value
Operation id	`post-apx-v1-violations`
Origin	APX
Scopes	`apx.violations:manage`
Request body	Violation

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	Violation	Idempotent replay — same key + same body returns the violation's current representation (Part 4 §4.2a).
201	Violation	Violation recorded (status `detected`, or `dismissed` when the vehicle was entitled).
400	Problem	Missing Idempotency-Key (`idempotency-key-required`), or a body that fails the schema or a §19.9 field rule — e.g. no `detection`, or a position whose first element is outside −180..180 (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	`reference-unknown` — `place`, `space`, or another body Reference names nothing visible to the caller, or `violationType` is outside the served registries and code lists.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.3 GET /v1/violations/{id}

Read a violation. Returns the violation including evidence links, the eligibility check, notice, appeal, and the immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-violations-id`
Origin	APX

Item	Value
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	The violation.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.4 POST /v1/violations/{id}/review

Review a detected candidate (guided enforcement). Transition `detected → confirmed` or `detected → dismissed`. The officer's decision is recorded with reason and reviewer; a `violationType` in the body corrects the detector's classification. `dismiss` without `reason` is 400 `invalid-request`. Any other starting state is 409 `violation-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-violations-id-review`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationReview

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Reviewed violation.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	Illegal transition (not in `detected`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.5 POST /v1/violations/{id}/issue

Issue the notice or citation. Transition `confirmed → issued` — or `detected → issued` for `automated` detections where the policy in force permits unreviewed issuance (`EnforcementPolicy.unreviewedIssuance`, or the operator's published documentation where the policy is silent); a `guided` or `manual` detection still in `detected`, or an automated one the policy does not permit, is 409 `violation-not-issuable`. Whatever the detection mode, `issue` is also 409 `violation-not-issuable` while any LPR read in `observations[]` has plate review `pending` or `rejected` (Part 13 §13.3a(4a), Part 19 §19.4 rule 6), and when the `relatedSession` link rests on match evidence with `plate.method: lenient` or `applied: false` (Part 5 §5.8, Part 19 §19.4 rule 5). Sets `notice`, `amount`, and `dueTime`.

Item	Value
Operation id	`post-apx-v1-violations-id-issue`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationIssue

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Issued violation.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	Not issuable from the current state or detection mode, while an evidence read's plate review is `pending` or `rejected`, or on lenient or unapplied match evidence (`violation-not-issuable`, Part 19 §19.4); or an illegal transition (`violation-transition-illegal`).
422	Problem	Refused by the enforcement policy in force (delivery method, notice deadline, penalty cap, or signage).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.6 POST /v1/violations/{id}/payment

Attach the settling Payment reference. Transition `issued → paid`. The payment itself is taken through the Part 13 surface (`POST /v1/payments`, a payment link, or an APDS Payment ingested from a pay station); this attaches its reference. Not in `issued` is 409 `violation-transition-illegal`. A body `amount` below what is outstanding is a partial payment (Part 19 §19.6a): it is appended to `payments[]`, `amountPaid` grows, and the violation stays `issued`; it moves to `paid` when `amountPaid` reaches `amount`.

Item	Value
Operation id	`post-apx-v1-violations-id-payment`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationPaymentAttachment

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Paid violation.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	Illegal transition (not in `issued`).

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.7 POST /v1/violations/{id}/appeals

Open an appeal. Transition `issued → appealed`, or `paid → appealed` within the policy's `appealWindowDays` (pay-then-appeal, Part 19 §19.6); the state it came from is recorded as `appeal.openedFrom`. One appeal per violation: a second appeal, an appeal on a closed or voided violation, or one outside the appeal window is 409 `appeal-closed`. From a state that was never issued (`detected`, `confirmed`, `dismissed`) it is 409 `violation-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-violations-id-appeals`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationAppealOpen

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Appealed violation.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	Appeal already opened once, violation closed/voided, or window passed (`appeal-closed`); or a state that was never issued (`violation-transition-illegal`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.8 POST /v1/violations/{id}/appeals/resolve

Resolve an appeal. `upheld →` back to `appeal.openedFrom` (`issued`, or `paid` for a pay-then-appeal); `reduced →` the same, with `amount` replaced by `adjustedAmount` (400 `invalid-request` when it is absent); `dismissed → closed`. A pay-then-appeal resolved `reduced` or `dismissed` carries the Part 13 `refund` reference. No open appeal, in whatever state, is 409 `appeal-closed`.

Item	Value
Operation id	`post-apx-v1-violations-id-appeals-resolve`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationAppealResolution

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Resolved violation.

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Response	Body	Meaning
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	No open appeal.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.9 POST /v1/violations/{id}/void

Void a violation. Valid from every non-terminal state (`detected`, `confirmed`, `issued`, `appealed`, `paid`); the record and its statusHistory remain readable. Voiding a `paid` violation SHOULD carry the Part 13 `refund` reference. From a terminal state (`dismissed`, `closed`, `voided`) it is 409 `violation-transition-illegal`.

Item	Value
Operation id	`post-apx-v1-violations-id-void`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationVoid

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	Violation	Voided violation.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such violation.
409	Problem	Already terminal (`dismissed`, `closed`, or `voided`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.10 GET /v1/enforcement/eligibility

Is this vehicle entitled to be here right now?. The guided-enforcement screen-pop (Part 19 §19.3): one call answers whether a credential is covered at a place at an instant, and by what — composing the APDS AssignedRights (APDS's own enforcement source of truth), Sessions, and the reservation/permit profiles the server holds. A convenience READ in the spirit of lane inquiry and the occupancy snapshot: the AssignedRight remains authoritative and a client MAY derive the same answer from the native routes. Lives under `/v1/enforcement` (not `/v1/violations/…`) because no violation exists yet when the question is asked.

Item	Value
Operation id	`get-apx-v1-enforcement-eligibility`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

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Parameter	In	Required	Type	Description
`credential`	query	yes	string	The credential value — plate string, permit number, transponder id.
`credentialType`	query	no	CredentialTypeEnum	APDS CredentialTypeEnum; defaults to `licensePlate`.
`place`	query	yes	string uuid	HierarchyElement UUID the vehicle is observed at (subtree semantics for rights bound to an ancestor).
`at`	query	no	string date-time	The instant to evaluate; defaults to now.

Response	Body	Meaning
200	EligibilityResult	The entitlement answer with its basis.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place element.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.11 GET /v1/enforcement/policies

List enforcement policies. Policies bound at or below `place`, optionally filtered by status.

Item	Value
Operation id	`get-apx-v1-enforcement-policies`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	string uuid	
`status`	query	no	string (active, superseded, retired)	
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated policies (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.12 POST /v1/enforcement/policies

Create an enforcement policy (idempotent). Binds jurisdictional rules to a HierarchyElement. `Idempotency-Key` REQUIRED. The policy applies to the element and its subtree from `effectiveFrom` unless a descendant carries its own.

Item	Value
Operation id	`post-apx-v1-enforcement-policies`
Origin	APX
Scopes	`apx.violations:manage`
Request body	EnforcementPolicy

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	EnforcementPolicy	Idempotent replay — same key + same body returns the policy's current representation (Part 4 §4.2a).
201	EnforcementPolicy	Policy created.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	`reference-unknown` — `place` names nothing visible to the caller; or `request-unprocessable` — an inconsistent policy, e.g. `effectiveTo` before `effectiveFrom`, or an escalation step whose fixed `addAmount` alone exceeds `overallCeiling.maximumAmount`. (Steps that only might reach the ceiling are lawful: the ceiling clamps, §19.10 rule 3.)
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.13 GET /v1/enforcement/policies/effective

The policy in force at a place. Resolves inheritance: the nearest ancestor-or-self `active` policy whose effective window covers `at` (default now). This is exactly what the server applies at `issue` and for escalation, so handhelds, pipelines, and appeals portals see the same rules.

Item	Value
Operation id	`get-apx-v1-enforcement-policies-effective`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	yes	string uuid	
`at`	query	no	string date-time	

Response	Body	Meaning
200	EnforcementPolicy	The effective policy.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place, or no policy in force for it.

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.14 GET /v1/enforcement/policies/{id}

Read an enforcement policy. Returns the policy including its immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-enforcement-policies-id`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	EnforcementPolicy	The policy.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such policy.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.15 PUT /v1/enforcement/policies/{id}

Update an enforcement policy (full update, versioned). Full-update semantics. The precondition is the `version` last read, sent as `If-Match: "<version>"` or as the body's `version` (Part 4 §4.2a); a stale one is 409 `version-conflict` and nothing is written. Changes apply to issuance and escalation from the update onward; violations already issued keep the `policy` version they were issued under.

Item	Value
Operation id	`put-apx-v1-enforcement-policies-id`
Origin	APX
Scopes	`apx.violations:manage`
Request body	EnforcementPolicy

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	EnforcementPolicy	Updated policy.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such policy.

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Response	Body	Meaning
409	Problem	Stale version (`version-conflict`, current version in `detail`).
422	Problem	`reference-unknown` (unknown `place`) or `request-unprocessable` (an inconsistent policy, as on create).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.16 GET /v1/enforcement/signage

List signage records. Signage bound at or below `place`, optionally filtered by status.

Item	Value
Operation id	`get-apx-v1-enforcement-signage`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	string uuid	
`status`	query	no	string (active, superseded, removed)	
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated signage (APDS PaginatedList shape); with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.17 POST /v1/enforcement/signage

Record posted signage (idempotent). Records the text, photo, and position of a sign at a place. `Idempotency-Key` REQUIRED. To change the wording later, create a new record (or new version) with the new `effectiveFrom` and set the old one's `effectiveTo` — historical text is never rewritten.

Item	Value
Operation id	`post-apx-v1-enforcement-signage`
Origin	APX
Scopes	`apx.violations:manage`
Request body	Signage

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Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	Signage	Idempotent replay — same key + same body returns the record's current representation (Part 4 §4.2a).
201	Signage	Signage recorded.
400	Problem	Missing Idempotency-Key (`idempotency-key-required`) or a body that fails the schema (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Idempotency-Key replayed with a different body.
422	Problem	`reference-unknown` — `place` or `policy` names nothing visible to the caller.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.18 GET /v1/enforcement/signage/effective

The signage in force at a place. Every `active` Signage record bound to `place` or an ancestor whose effective window covers `at` (default now) — what the server freezes onto a violation at `issue`.

Item	Value
Operation id	`get-apx-v1-enforcement-signage-effective`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	yes	string uuid	
`at`	query	no	string date-time	

Response	Body	Meaning
200	object	Signage in force (may be empty).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such place.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.19 GET /v1/enforcement/signage/{id}

Read a signage record. Returns the record including its immutable statusHistory.

Item	Value
Operation id	`get-apx-v1-enforcement-signage-id`
Origin	APX
Scopes	`apx.violations:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

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Response	Body	Meaning
200	Signage	The signage record.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such record.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.20 PUT /v1/enforcement/signage/{id}

Update a signage record (full update, versioned). Full-update semantics. The precondition is the `version` last read, sent as `If-Match: "<version>"` or as the body's `version` (Part 4 §4.2a); a stale one is 409 `version-conflict`. Changing `text` on a record that any issued violation references is refused (422 `signage-referenced`) — supersede it instead.

Item	Value
Operation id	`put-apx-v1-enforcement-signage-id`
Origin	APX
Scopes	`apx.violations:manage`
Request body	Signage

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	Signage	Updated record.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such record.
409	Problem	Stale version (`version-conflict`, current version in `detail`).
422	Problem	Text change on a referenced record (`signage-referenced`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.21 POST /v1/violations:search

The violations lookup with the plate in a body. The same lookup as `GET /v1/violations` (Part 19 §19.2) with the keys in the body (Part 9 §9.6). Same rules and response.

Item	Value
Operation id	`post-apx-v1-violations-search`
Origin	APX
Scopes	`apx.violations:read`
Request body	object

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Response	Body	Meaning
200	object	Matching violations.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.22 POST /v1/enforcement/eligibility:check

The eligibility check with the credential in a body. The same question as `GET /v1/enforcement/eligibility` (Part 19 §19.3) with the credential in the body (Part 9 §9.6). Same answer.

Item	Value
Operation id	`post-apx-v1-enforcement-eligibility-check`
Origin	APX
Scopes	`apx.violations:read`
Request body	object

Response	Body	Meaning
200	EligibilityResult	The eligibility result.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.23 POST /v1/enforcement/violation-imports

Import a violation an external enforcement system issued (idempotent). Records a citation, warning, or notice that another system detected and issued, in whatever state the source reports it, with the `statusHistory[]` times the source recorded (Part 19 §19.13). The path is under `/v1/enforcement`, like the eligibility check, so it cannot be mistaken for `/v1/violations/{id}` (§19.2).

Item	Value
Operation id	`post-apx-v1-enforcement-violation-imports`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationImport

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	yes	string	

Response	Body	Meaning
200	Violation	An existing import updated, the same revision again (no change), or an idempotent replay.

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Response	Body	Meaning
201	Violation	Imported.
400	Problem	Missing `Idempotency-Key` (`idempotency-key-required`), or a body that fails the schema — no `apds-ext:apx:violation-source@1.0`, or a state at or past issuance without `notice` or `amount` (`invalid-request`, with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`), or a source revision older than the one held (`version-conflict`).
422	Problem	Unknown `place` or a `violationType` outside the served registries (`reference-unknown`); `violationStatus: paid` with `amountPaid` below `amount`, or a payment in another currency than `amount` (`request-unprocessable`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.1.24 POST /v1/violations/{id}/session

Set, correct, or clear the Session a violation relates to. Sets, corrects, or clears (`session: null`) `relatedSession` after creation, with the match evidence (Part 19 §19.13; `apds-ext:apx:match-evidence@1.0` is written onto the violation). The link is not a lifecycle transition: it is valid in every state, terminal ones included, and appends nothing to `statusHistory[]`. `If-Match` carries the Violation `version` last read (409 `version-conflict` when stale; nothing is written). On a change `version` increments and `apx.violations.status.v1` is published; resending what the violation already holds is a no-op (200, no new version, no event). A Session that does not exist or is not visible to the caller is 422 `reference-unknown`; one at a place outside the hierarchy of the violation's `place` (neither the same element, an ancestor, nor a descendant) is 422 `request-unprocessable`.

Item	Value
Operation id	`post-apx-v1-violations-id-session`
Origin	APX
Scopes	`apx.violations:manage`
Request body	ViolationSessionLink

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	Violation	The violation with its Session link as it now stands.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Stale `If-Match` (`version-conflict`); nothing is written.
422	Problem	`reference-unknown` — the Session names nothing visible to the caller; `request-unprocessable` — the Session is at a place outside the hierarchy of the violation's `place`.

Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2 Plate lists

Method	Path	Summary	Scopes
GET	`/v1/plate-lists`	List plate lists	`apx.platelists:read`
POST	`/v1/plate-lists`	Create a plate list	`apx.platelists:manage`
GET	`/v1/plate-lists/{id}`	Read a plate list	`apx.platelists:read`
PUT	`/v1/plate-lists/{id}`	Replace a plate list's policy (name, category, places, status)	`apx.platelists:manage`
GET	`/v1/plate-lists/{id}/entries`	List a plate list's entries	`apx.platelists:read`
POST	`/v1/plate-lists/{id}/entries`	Add an entry to a plate list	`apx.platelists:manage`
GET	`/v1/plate-lists/{id}/entries/{entryId}`	Read one entry	`apx.platelists:read`
DELETE	`/v1/plate-lists/{id}/entries/{entryId}`	Remove an entry	`apx.platelists:manage`

5.2.1 GET /v1/plate-lists

List plate lists. The lists visible to the caller: those with a `places[]` entry inside the grant, and those owned by the caller's `apx_org`. `mode=change&cursor=` serves the Part 5 §5.2 feed of lists (entries have their own feed).

Item	Value
Operation id	`get-apx-v1-plate-lists`
Origin	APX
Scopes	`apx.platelists:read`
Request body	—

Parameter	In	Required	Type	Description
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	string uuid	Lists that apply at this element or its subtree.
`category`	query	no	string	
`status`	query	no	string (active, suspended, retired)	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated lists; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	`mode=change` only (Part 5 §5.2): the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set). Problem type `target-not-found`; re-sync with `mode=full`. The cursor is an APX parameter, so this refusal is always a Problem (Part 5 §5.2 rules 2 and 5).

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.2 POST /v1/plate-lists

Create a plate list. Creates a list owned by the caller's `apx_org` (Part 24 §24.1). Every `places[].place` must lie inside the grant (403 `insufficient-grant`). `Idempotency-Key` optional (Part 4 §4.2a). Publishes `apx.platelists.changed.v1`.

Item	Value
Operation id	`post-apx-v1-plate-lists`
Origin	APX
Scopes	`apx.platelists:manage`
Request body	PlateList

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	PlateList	Idempotent replay.
201	PlateList	Created.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	A `category` outside the served registries, or a `places[].place` that does not exist (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.3 GET /v1/plate-lists/{id}

Read a plate list.

Item	Value
Operation id	`get-apx-v1-plate-lists-id`
Origin	APX
Scopes	`apx.platelists:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	PlateList	The list.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

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Response	Body	Meaning
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.4 PUT /v1/plate-lists/{id}

Replace a plate list's policy (name, category, places, status). Full replacement with the version last read as `If-Match` or body `version` (409 `version-conflict`, Part 4 §4.2a). Entries are not part of this body. Publishes `apx.platelists.changed.v1`.

Item	Value
Operation id	`put-apx-v1-plate-lists-id`
Origin	APX
Scopes	`apx.platelists:manage`
Request body	PlateList

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	PlateList	The list as it now stands.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Stale version (`version-conflict`).
422	Problem	A `category` outside the served registries, or an unknown place (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.5 GET /v1/plate-lists/{id}/entries

List a plate list's entries. Entries of one list, optionally by exact credential value; `mode=change&cursor=` serves the Part 5 §5.2 feed of entries so a screening module keeps a local copy current. Plate values appear only under `apx.platelists:*` (Part 9 §9.6); a consumer holding only `apx.data:read` may subscribe to digests instead (§9.6 rule 6).

Item	Value
Operation id	`get-apx-v1-plate-lists-id-entries`
Origin	APX
Scopes	`apx.platelists:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`credential`	query	no	string	Exact `credential.credentialIdentification` match.
`activeAt`	query	no	string date-time	Only entries whose validity contains this instant.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated entries; with `mode=change`, the changes after `cursor` in the same envelope (Part 5 §5.2 rule 8).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.6 POST /v1/plate-lists/{id}/entries

Add an entry to a plate list. Adds a credential to the list (Part 24 §24.2). An entry whose credential is already on the list with an overlapping validity is updated in place (200) rather than duplicated. `Idempotency-Key` optional. Publishes `apx.platelists.changed.v1` with the list.

Item	Value
Operation id	`post-apx-v1-plate-lists-id-entries`
Origin	APX
Scopes	`apx.platelists:manage`
Request body	PlateListEntry

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	PlateListEntry	An existing entry for the credential updated, or an idempotent replay.
201	PlateListEntry	Added.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

Response	Body	Meaning
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	An inverted validity window (`request-unprocessable`), or a full card number where a plate is expected (`personal-data-not-permitted`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.7 GET /v1/plate-lists/{id}/entries/{entryId}

Read one entry.

Item	Value
Operation id	`get-apx-v1-plate-lists-id-entries-entryid`
Origin	APX
Scopes	`apx.platelists:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`entryId`	path	yes	string uuid	

Response	Body	Meaning
200	PlateListEntry	The entry.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.2.8 DELETE /v1/plate-lists/{id}/entries/{entryId}

Remove an entry. Removes the credential from the list; the entry feed emits a tombstone. Publishes `apx.platelists.changed.v1`.

Item	Value
Operation id	`delete-apx-v1-plate-lists-id-entries-entryid`
Origin	APX
Scopes	`apx.platelists:manage`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	
`entryId`	path	yes	string uuid	

Response	Body	Meaning
204	—	Removed.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).

Response	Body	Meaning
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3 Resolution

When a customer presses the intercom. The agent, human or AI, should not have to log into another system, find the facility, find the lane, find the transaction, and reconstruct what happened.

Method	Path	Summary	Scopes
POST	`/v1/resolution/contexts`	Resolve a customer-service context from any known identifiers	`apx.resolution:read`
GET	`/v1/resolution/contexts/{id}`	Re-read (recompute) a resolution context	`apx.resolution:read`
GET	`/v1/resolution/contexts/{id}/allowed-actions`	Re-evaluate the allowed actions for a context	`apx.resolution:read`
GET	`/v1/credentials/{id}/passback`	Anti-passback status for a credential	`apx.control:read`
GET	`/v1/approvals`	List approval requests	`apx.resolution:read`
POST	`/v1/approvals`	Ask for approval of an action	`apx.support:manage`
GET	`/v1/approvals/{id}`	Read an approval request	`apx.resolution:read`
POST	`/v1/approvals/{id}/decide`	Approve or deny	`apx.support:manage`

5.3.1 POST /v1/resolution/contexts

Resolve a customer-service context from any known identifiers. THE aggregation call (Part 17 §17.2): accepts whatever parking-domain identifiers are known (lane, device, plate, ticket, credential, reservation code…) — telephony mapping stays on the call platform's side (§17.1) — and returns everything the server can resolve — issue classification, lane status, vehicle, session, account, passback, device status, recent overrides, support history — plus the policy-decided allowedActions. Sections the caller's scopes and `apx_places` grant could not read directly are omitted. May return `status: partial` with `pendingSources` rather than waiting on a slow source; re-read to refresh. Scope apx.resolution:read.

Item	Value
Operation id	`post-apx-v1-resolution-contexts`
Origin	APX
Scopes	`apx.resolution:read`
Request body	ResolutionResolveRequest

Response	Body	Meaning
201	ResolutionContext	The resolved context (possibly partial).
400	Problem	No usable identifier supplied: the body carries none of the identifying members (device, place, lane, session, holder, credential, plate, ticketNumber, reservationCode) — problem type `invalid-request` (Part 17 §17.1).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No identifier resolved to anything this implementation knows.

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Response	Body	Meaning
422	Problem	A `commsPoint`, `callerId`, `dialedNumber` or `commsDeviceId` this implementation does not hold (`comms-point-unknown`, Part 17 §17.1 and Part 26 §26.4), or a registered code value outside the served registries (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.2 GET /v1/resolution/contexts/{id}

Re-read (recompute) a resolution context. Returns the context recomputed against current state — `version` increments when anything material changed. Use after events arrive or when the initial response was partial. Scope apx.resolution:read.

Item	Value
Operation id	`get-apx-v1-resolution-contexts-id`
Origin	APX
Scopes	`apx.resolution:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ResolutionContext	The current context.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such context (contexts MAY expire; re-resolve).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.3 GET /v1/resolution/contexts/{id}/allowed-actions

Re-evaluate the allowed actions for a context. The policy layer's current decisions (Part 17 §17.3) — cheaper than a full context recompute; call before executing when time has passed. The consuming agent (human or AI) MUST NOT decide permissibility itself. Scope apx.resolution:read.

Item	Value
Operation id	`get-apx-v1-resolution-contexts-id-allowed-actions`
Origin	APX
Scopes	`apx.resolution:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	object	Current decisions.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such context.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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5.3.4 GET /v1/credentials/{id}/passback

Anti-passback status for a credential. The credential's passback overlay: state, expected vs recorded presence, last access. The write side is the `resetPassback` / `forceIn` / `forceOut` commands (Part 17 §17.4). Scope apx.control:read; the place grant must cover the credential's last-access place.

Item	Value
Operation id	`get-apx-v1-credentials-id-passback`
Origin	APX
Scopes	`apx.control:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	APDS Credential UUID.

Response	Body	Meaning
200	PassbackStatus	Passback status (`state` is `unknown` for a known credential whose passback is not tracked).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	No such credential (problem type `target-not-found`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.5 GET /v1/approvals

List approval requests. Approval requests at the caller's places, newest first (Part 17 §17.3a); an approver's queue is `status=pending&role=…`.

Item	Value
Operation id	`get-apx-v1-approvals`
Origin	APX
Scopes	`apx.resolution:read`
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	string uuid	
`status`	query	no	string (pending, approved, denied, expired)	
`role`	query	no	string	
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated approval requests.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.6 POST /v1/approvals

Ask for approval of an action. An agent whose AllowedAction said `requiresApproval` asks the named role to decide (Part 17 §17.3a). `place` must lie inside the grant. `Idempotency-Key` optional. Publishes `apx.approvals.changed.v1`; the approver's system subscribes to it or reads the queue.

Item	Value
Operation id	`post-apx-v1-approvals`
Origin	APX
Scopes	`apx.support:manage`
Request body	ApprovalRequest

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	ApprovalRequest	Idempotent replay.
201	ApprovalRequest	Created, `status` = `pending`.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	`Idempotency-Key` replayed with a different body (`idempotency-conflict`).
422	Problem	A `place` or `target` that does not exist (`reference-unknown`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.7 GET /v1/approvals/{id}

Read an approval request. The request with its `decision` once made, or its `expired` status once `expiresAt` has passed (Part 17 §17.3a).

Item	Value
Operation id	`get-apx-v1-approvals-id`
Origin	APX
Scopes	`apx.resolution:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ApprovalRequest	The request with its decision, if made.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.3.8 POST /v1/approvals/{id}/decide

Approve or deny. The approver decides: `pending` → `approved` or `denied` (Part 17 §17.3a). The agent then executes the action with `Approval` evidence citing the request. A request already decided or expired is 409

`approval-closed`. Publishes `apx.approvals.changed.v1`.

Item	Value
Operation id	`post-apx-v1-approvals-id-decide`
Origin	APX
Scopes	`apx.support:manage`
Request body	ApprovalDecision

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	

Response	Body	Meaning
200	ApprovalRequest	The decided request.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Already decided or expired (`approval-closed`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.4 Support

What happened on the last call. Support-interaction history for a resolution context: who spoke to the customer, through which channel, about what, and what was done.

Method	Path	Summary	Scopes
GET	`/v1/support/interactions`	Support history for a subject	`apx.support:manage`
POST	`/v1/support/interactions`	Record a support interaction	`apx.support:manage`
GET	`/v1/support/interactions/{id}`	Read one support interaction	`apx.support:manage` `apx.resolution:read`
PUT	`/v1/support/interactions/{id}`	Update (complete) a support interaction	`apx.support:manage`

5.4.1 GET /v1/support/interactions

Support history for a subject. Recent interactions filtered by any subject key. At least one filter is required; none is 400 `invalid-request`. `correlationId`, `interactionId`, and `credential` each suffice on their own, so one correlation id reconstructs the episode (Part 17 §17.7). Scope apx.support:manage (or apx.resolution:read for read-only consumers).

Item	Value
Operation id	`get-apx-v1-support-interactions`
Origin	APX
Scopes	`apx.support:manage`
Request body	—

Parameter	In	Required	Type	Description
`plate`	query	no	string	
`holder`	query	no	string uuid	
`account`	query	no	string uuid	
`session`	query	no	string uuid	
`place`	query	no	string uuid	
`since`	query	no	string date-time	
`correlationId`	query	no	string uuid	Correlation chain id (Part 17 §17.7). Exact match.
`interactionId`	query	no	string	The calling application's opaque interaction identifier. Exact match.
`credential`	query	no	string uuid	APDS Credential UUID (matches `subjects.credential`).
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	object	Paginated interactions (APDS PaginatedList shape).
400	Problem	No filter given (problem type `invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.4.2 POST /v1/support/interactions

Record a support interaction. Records one customer-service interaction (human or AI) so future resolution contexts can surface it. Summaries, not transcripts (Part 9 §9.6). Scope apx.support:manage.

Item	Value
Operation id	`post-apx-v1-support-interactions`
Origin	APX
Scopes	`apx.support:manage`
Request body	SupportInteraction

Parameter	In	Required	Type	Description
`Idempotency-Key`	header	no	string	When given, the operation is idempotent per Part 4 §4.2a: a replay with the same body returns the current representation (200), a different body is 409 `idempotency-conflict`. Clients that retry SHOULD send it.

Response	Body	Meaning
200	SupportInteraction	Idempotent replay — the interaction's current representation (Part 4 §4.2a).
201	SupportInteraction	Recorded interaction.
400	Problem	Invalid interaction (problem type `invalid-request`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	Problem	Same `Idempotency-Key` replayed with a different body (`idempotency-conflict`).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.4.3 GET /v1/support/interactions/{id}

Read one support interaction. One recorded interaction by id (Part 17 §17.6). Scope apx.support:manage, or apx.resolution:read for read-only consumers; the interaction's `place` must be inside the caller's grant.

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Item	Value
Operation id	`get-apx-v1-support-interactions-id`
Origin	APX
Scopes	`apx.support:manage`, `apx.resolution:read`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	SupportInteraction id.

Response	Body	Meaning
200	SupportInteraction	The interaction.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

5.4.4 PUT /v1/support/interactions/{id}

Update (complete) a support interaction. Replaces the interaction — typically to complete a record opened when the call was answered with `endedAt`, `resolution`, `summary`, and `actions` (Part 17 §17.6). Optimistic concurrency per Part 4 §4.2a: send the `version` last read as `If-Match` (or in the body); a stale one is 409 `version-conflict`. The server increments `version` and publishes `apx.support.interaction.recorded.v1` again; consumers tell a create from an update by `version`. `id` in the body, when present, MUST equal the path id. Scope apx.support:manage.

Item	Value
Operation id	`put-apx-v1-support-interactions-id`
Origin	APX
Scopes	`apx.support:manage`
Request body	SupportInteraction

Parameter	In	Required	Type	Description
`id`	path	yes	string uuid	SupportInteraction id.
`If-Match`	header	no	string	The `version` the client last read, as an entity tag (`"7"`). A stale value is 409 `version-conflict`; nothing is written (Part 4 §4.2a). Equivalent to sending `version` in the body.

Response	Body	Meaning
200	SupportInteraction	The updated interaction.
400	Problem	The request is malformed: the body or a parameter fails the operation's schema or a normative field rule (problem type `invalid-request`, with an `errors[]` member naming each offending JSON Pointer), or a REQUIRED Idempotency-Key is absent (`idempotency-key-required`). Part 12.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

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Response	Body	Meaning
404	Problem	The addressed resource does not exist (problem type `target-not-found`). A resource at a place outside the caller's `apx_places` grant is 403 `insufficient-grant` instead (Part 9 §9.3). A resource that exists but lies outside a narrower ownership scope (a merchant's own programs, a valet customer's own ticket) is reported as 404, so the answer never confirms another party's record exists (Part 9 §9.3a).
409	Problem	Stale `version` (`version-conflict`, Part 4 §4.2a); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

6 Webhooks (event deliveries)

6.1 Webhooks

Method	Path	Summary	Scopes
POST	`apx-event`	Signed APX event delivery	
POST	`apx-native-event`	APDS EventTypeEnum topic delivery	
POST	`apx.subscription.failed.v1`	A subscription exhausted its retry schedule	
POST	`apx.data.observation.created.v1`	An Observation was ingested	
POST	`apx.data.observation.updated.v1`	An ingested Observation was replaced	
POST	`apx.reservation.noshow.v1`	A reservation reached its no-show condition	

6.1.1 POST apx-event

Signed APX event delivery. Every webhook delivery POSTs one EventEnvelope with headers `APX-Signature` (v1=HMAC-SHA256(secret, timestamp + "." + body)), `APX-Timestamp` (RFC 3339, ±5 min replay window), `APX-Delivery-Id` (unique per attempt; envelope `id` is stable across retries), and `APX-Key-Id` (REQUIRED during secret-rotation overlap windows — Part 9 §9.4). Respond 2xx to acknowledge; anything else triggers the normative retry schedule (Part 8).

Item	Value
Operation id	`receive-apx-event`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope

Response	Body	Meaning
200	—	Acknowledged.

6.1.2 POST apx-native-event

APDS EventTypeEnum topic delivery. A delivery on an APDS 4.1 topic (`SessionCreated`, `PlaceUpdated`, …): `type` is an APDS `EventTypeEnum` value, `data` the APDS `EventData` shape (the created/updated entity; for a `*Deleted` topic the last state), and `subject` references the entity (Part 5 §5.4, Part 8 §8.2). Signed and retried like every delivery.

Item	Value
Operation id	`receive-apx-native-event`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope / object

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Parameter	In	Required	Type	Description
`APX-Signature`	header	yes	string	v1= + hex HMAC-SHA256(secret, APX-Timestamp + "." + raw body), computed per attempt.
`APX-Timestamp`	header	yes	string date-time	RFC 3339 time of THIS attempt (not of the event or of the first attempt).
`APX-Delivery-Id`	header	yes	string uuid	UUID unique per attempt; the envelope `id` is the dedup key.
`APX-Key-Id`	header	no	string	The signing key's id — REQUIRED during a rotation overlap (Part 9 §9.4).

Response	Body	Meaning
200	—	Acknowledged.

6.1.3 POST apx.subscription.failed.v1

A subscription exhausted its retry schedule. Published when a subscription enters `failed` (Part 8 §8.3). `subject` references the subscription (`className` `ApxEventSubscription`); `data` is a SubscriptionFailure. Delivered to other subscriptions of the same `apx_org` that list the topic, never to the failed one.

Item	Value
Operation id	`receive-apx-subscription-failed`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope / object

Parameter	In	Required	Type	Description
`APX-Signature`	header	yes	string	v1= + hex HMAC-SHA256(secret, APX-Timestamp + "." + raw body), computed per attempt.
`APX-Timestamp`	header	yes	string date-time	RFC 3339 time of THIS attempt (not of the event or of the first attempt).
`APX-Delivery-Id`	header	yes	string uuid	UUID unique per attempt; the envelope `id` is the dedup key.
`APX-Key-Id`	header	no	string	The signing key's id — REQUIRED during a rotation overlap (Part 9 §9.4).

Response	Body	Meaning
200	—	Acknowledged.

6.1.4 POST apx.data.observation.created.v1

An Observation was ingested. One event per ingested read. `data` is the APDS `ObservationElement` (an ingested ObservationSet yields one event per element); `subject` references it with `className` `ObservationElement`; publishers MUST populate `elementIds` with the observing lane or place, which is the event's place binding (Part 8 §8.5). Plate values are subject to Part 9 §9.6.

Item	Value
Operation id	`receive-apx-data-observation-created`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope / object

Parameter	In	Required	Type	Description
`APX-Signature`	header	yes	string	v1= + hex HMAC-SHA256(secret, APX-Timestamp + "." + raw body), computed per attempt.
`APX-Timestamp`	header	yes	string date-time	RFC 3339 time of THIS attempt (not of the event or of the first attempt).

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Parameter	In	Required	Type	Description
`APX-Delivery-Id`	header	yes	string uuid	UUID unique per attempt; the envelope `id` is the dedup key.
`APX-Key-Id`	header	no	string	The signing key's id — REQUIRED during a rotation overlap (Part 9 §9.4).

Response	Body	Meaning
200	—	Acknowledged.

6.1.5 POST apx.data.observation.updated.v1

An ingested Observation was replaced. Published whenever an ingested Observation changes — for example the LPR system revising `accessEvent` through `PUT /v1/lpr/reads/{observation}/access-event` (Part 13 §13.3a(4), §13.4), or a reviewer's plate decision through `PUT /v1/lpr/reads/{observation}/plate` (§13.3a(4a)). `data` is the APDS `ObservationElement` as it now stands; `subject` and the place binding (`elementIds`) are as for `apx.data.observation.created.v1`. Consumers key on the Observation id and keep the highest `version`. Plate values are subject to Part 9 §9.6.

Item	Value
Operation id	`receive-apx-data-observation-updated`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope / object

Parameter	In	Required	Type	Description
`APX-Signature`	header	yes	string	v1= + hex HMAC-SHA256(secret, APX-Timestamp + "." + raw body), computed per attempt.
`APX-Timestamp`	header	yes	string date-time	RFC 3339 time of THIS attempt (not of the event or of the first attempt).
`APX-Delivery-Id`	header	yes	string uuid	UUID unique per attempt; the envelope `id` is the dedup key.
`APX-Key-Id`	header	no	string	The signing key's id — REQUIRED during a rotation overlap (Part 9 §9.4).

Response	Body	Meaning
200	—	Acknowledged.

6.1.6 POST apx.reservation.noshow.v1

A reservation reached its no-show condition. `data` is a ReservationSummary (`reservation`, `reservationState` `noShow`, `plannedStart`); `subject` references the AssignedRight (Part 14 §14.1, Part 8 §8.7).

Item	Value
Operation id	`receive-apx-reservation-noshow`
Origin	APX webhook
Scopes	none
Request body	EventEnvelope / object

Parameter	In	Required	Type	Description
`APX-Signature`	header	yes	string	v1= + hex HMAC-SHA256(secret, APX-Timestamp + "." + raw body), computed per attempt.
`APX-Timestamp`	header	yes	string date-time	RFC 3339 time of THIS attempt (not of the event or of the first attempt).
`APX-Delivery-Id`	header	yes	string uuid	UUID unique per attempt; the envelope `id` is the dedup key.

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Parameter	In	Required	Type	Description
`APX-Key-Id`	header	no	string	The signing key's id — REQUIRED during a rotation overlap (Part 9 §9.4).

Response	Body	Meaning
200	—	Acknowledged.

7 APDS 4.1 native routes

7.1 Places

Method	Path	Summary	Scopes
GET	`/places`	List Places	`po` `sp` `ep` `ad`
POST	`/places`	Create Place	`po`
GET	`/places/{id}`	Get Place	`po` `sp` `ep` `ad`
PUT	`/places/{id}`	Update Place	`po`
DELETE	`/places/{id}`	Delete Place	`po`

7.1.1 GET /places

List Places. Returns a list of places potentially filtered by a combination of : * **latitude**, **longitude** and **radius** : retrieve all places within a geographic area, * **types** : retrieve all places of the given type, * **right_type** : retrieve all places associated with the right specification type, * **structure_type** : retrieve all places associated with the specified structure type, * **structure_grade** : retrieve all places associated with the specified structure grade, * **name** : retrieve all places which match the name of the facilities, * **layer** : specify the maximum hierarchy element layer desired, * **operator** : the id of the operator of this location * **modified_since** : retrieve all places that have changed from that given instant onwards, * **expand** : a comma-separated list of optional object attributes associated to a place that should be included in the result set.

Item	Value
Operation id	`get-places`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`type`	query	no	array of HierarchyElementTypeEnum	Comma-separated list of place types to consider. All will be assumed if parameter is not used or left blank.
`right_type`	query	no	array of RightSpecificationTypeEnum	Comma-separated list of right specification types to consider. All will be assumed if parameter is not used or left blank.
`structure_type`	query	no	array of StructureTypeEnum	Comma-separated list of types of structure in the hierarchy to consider (all will be assumed if parameter is not used or left blank)
`structure_grade`	query	no	array of StructureGradeEnum	Comma-separated list of Structure grades in the hierarchy to consider (all will be assumed if parameter is not used or left blank)

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Parameter	In	Required	Type	Description
`name`	query	no	string	Name of place hierarchy element (in any of its supported languages)
`layer`	query	no	integer	Most detailed (lower-level) layer of data desired. 0 (zero) being the first level (and higher numbers correspond to lower-levels of information). If left empty, the entire place hierarchy that matches the remaining parameters will be returned.
`operator`	query	no	string	id of the parking operator in charge of the location(s)
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to a place hierarchy element that should be included in the result set.
`page`	query	no	integer	The page number for paginated responses.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.

Response	Body	Meaning
200	HierarchyElementList / ChangeFeedPage	Ok
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	mode=change only: the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set) — problem type `target-not-found`; re-sync with mode=full (Part 5 §5.2 rules 2 and 5). The cursor is an APX parameter, so this refusal is always a Problem.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.1.2 POST /places

Create Place. Create a new place.

Item	Value
Operation id	`create-place`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	HierarchyElement

Response	Body	Meaning
201	ResponseStatus	Created

Response	Body	Meaning
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `id-collision` (client-supplied id already exists) instead of ResponseStatus.
422	Problem	A lane's `apds-ext:apx:lane-cameras@1.0` names a `cameraId` already configured on another lane of the same Place (problem type `request-unprocessable`, Part 13 §13.3a(5)); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.1.3 GET /places/{id}

Get Place. Returns the latest version of a given place by its identifier (or a specific version provided as a query parameter).

Item	Value
Operation id	`get-place`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the place.
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to a place hierarchy element that should be included in the result set.

Response	Body	Meaning
200	HierarchyElement	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.1.4 PUT /places/{id}

Update Place. Update an existing place using its identifier.

Item	Value
Operation id	`update-place`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	HierarchyElement / HierarchyElementChangePayload

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Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the place.
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`) instead of ResponseStatus.
422	Problem	A lane's `apds-ext:apx:lane-cameras@1.0` names a `cameraId` already configured on another lane of the same Place (problem type `request-unprocessable`, Part 13 §13.3a(5)); nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.1.5 DELETE /places/{id}

Delete Place. Delete an existing place using its identifier.

Item	Value
Operation id	`delete-place`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the place.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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7.2 Observation

Method	Path	Summary	Scopes
GET	`/observations`	get list of recorded observations	
POST	`/observations`	create an Observation or Observation Set	
GET	`/observations/{id}`	get a specific observation element	
PUT	`/observations/{id}`	update a specific observation element	
DELETE	`/observations/{id}`	delete a specific observation element	

7.2.1 GET /observations

get list of recorded observations. Lists `Observations` and allows searching/filtering by:

Item	Value
Operation id	`get-observations`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`start_before`	query	no	integer	Unix epoch **instant** to filter results starting before the given instant.
`end_before`	query	no	integer	Unix epoch **instant** to filter results ending before the given instant.
`start_after`	query	no	integer	Unix epoch **instant** to filter results starting after the given instant.
`end_after`	query	no	integer	Unix epoch **instant** to filter results ending after the given instant.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).

Response	Body	Meaning
200	object / ChangeFeedPage	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	mode=change only: the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set) — problem type `target-not-found`; re-sync with mode=full (Part 5 §5.2 rules 2 and 5). The cursor is an APX parameter, so this refusal is always a Problem.

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Response	Body	Meaning
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.2.2 POST /observations

create an Observation or Observation Set. create a singular `Observation` or an `Observation Set`

Item	Value
Operation id	`post-observations`
Origin	APDS 4.1 native route
Scopes	none
Request body	ObservationElement / ObservationSet

Response	Body	Meaning
201	ResponseStatus	Observation (or ObservationSet) created (APDS ResponseStatus, as on the other native creates).
400	ResponseStatus	Observation can not be created due to invalid or missing data. APX (Part 5 §5.1a, Part 12 §12.1): with `Accept: application/problem+json`, problem type `invalid-request` (with `errors[]`).
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	Observation can not be created due to conflict (id already exists). APX: with `Accept: application/problem+json`, problem type `id-collision`.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.2.3 GET /observations/{id}

get a specific observation element. get the latest version of a given `Observation` by its identifier (or a particular previous version when provided as a query parameter)

Item	Value
Operation id	`get-observation-id`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	unique observation identifier
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.

Response	Body	Meaning
200	ObservationElement	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.2.4 PUT /observations/{id}

update a specific observation element. update the given `Observation`

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Item	Value
Operation id	`update-observation-id`
Origin	APDS 4.1 native route
Scopes	none
Request body	ObservationElement / ObservationElementChangePayload

Parameter	In	Required	Type	Description
`id`	path	yes	string	unique observation identifier
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Observation can not be updated due to invalid or missing data. APX: with `Accept: application/problem+json`, problem type `invalid-request`.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.2.5 DELETE /observations/{id}

delete a specific observation element. delete the given `Observation`

Item	Value
Operation id	`delete-observation-id`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	unique observation identifier

Response	Body	Meaning
200	ResponseStatus	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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7.3 Organisations

Method	Path	Summary	Scopes
GET	`/contacts`	Get List of Organisations (Contacts)	`po` `sp` `ep` `ad`
POST	`/contacts`	create a new contact	
GET	`/contacts/{contactId}`	get details of particular contact / organisation	`po` `sp` `ep` `ad`
PUT	`/contacts/{contactId}`	update existing contact	
DELETE	`/contacts/{contactId}`	delete existing contact	

7.3.1 GET /contacts

Get List of Organisations (Contacts). Returns the latest list of all organisations and their public ids

Item	Value
Operation id	`get-contacts`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`type`	query	no	ContactPointTypeEnum	filter by this type of organisation/contact

Response	Body	Meaning
200	object	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).
500	ResponseStatus	Internal Server Error

7.3.2 POST /contacts

create a new contact. create a new contact point record which can then be referenced by other data elements

Item	Value
Operation id	`post-contact`
Origin	APDS 4.1 native route
Scopes	none
Request body	ContactPoint

Response	Body	Meaning
201	ResponseStatus	CREATED
400	ResponseStatus	BAD REQUEST. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	CONFLICT. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `id-collision` (client-supplied id already exists) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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7.3.3 GET /contacts/{contactId}

get details of particular contact / organisation. returns the details of the contact identified by {contactId}

Item	Value
Operation id	`get-single-contact`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`contactId`	path	yes	string	Unique identifier for the contact/organisation.

Response	Body	Meaning
200	ContactPoint	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	contact not found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).
500	ResponseStatus	Internal Server Error

7.3.4 PUT /contacts/{contactId}

update existing contact. update an existing contact point record which can then be referenced by other data elements

Item	Value
Operation id	`put-contact`
Origin	APDS 4.1 native route
Scopes	none
Request body	ContactPoint / ContactPointChangePayload

Parameter	In	Required	Type	Description
`contactId`	path	yes	string	Unique identifier for the contact/organisation.
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	NOT FOUND. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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7.3.5 DELETE /contacts/{contactId}

delete existing contact. delete an existing contact point record

Item	Value
Operation id	`delete-contact`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`contactId`	path	yes	string	Unique identifier for the contact/organisation.

Response	Body	Meaning
200	ResponseStatus	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	NOT FOUND. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	CONFLICT. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.4 Right Specifications

Method	Path	Summary	Scopes
GET	`/rights/specs`	List RightSpecifications	`po` `sp` `ep` `ad`
POST	`/rights/specs`	Create RightSpecification	`po`
GET	`/rights/specs/{id}`	Get RightSpecification	`po` `sp` `ep` `ad`
PUT	`/rights/specs/{id}`	Update RightSpecification	`po`
DELETE	`/rights/specs/{id}`	Delete RightSpecification	`po`

7.4.1 GET /rights/specs

List RightSpecifications. Returns a list of right specifications potentially filtered by a combination of : * **latitude**, **longitude** and **radius** : retrieve all right specifications used in a geographic area (via their associated place), * a list of **Places** : retrieve all right specifications connected to any of the given places, * **issuer** : the id of the entity that issued the right specification * **modified_since** : retrieve all right specifications that have changed from that given instant onwards, * **expand** : a comma-separated list of optional object attributes associated to a right specification that should be included in the result set.

Item	Value
Operation id	`get-right_specs`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)

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Parameter	In	Required	Type	Description
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`type`	query	no	array of HierarchyElementTypeEnum	Comma-separated list of place types to consider. All will be assumed if parameter is not used or left blank.
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`issuer`	query	no	string	id of the entity that issued the returned records
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to a right specification that should be included in the result set.
`page`	query	no	integer	The page number for paginated responses.

Response	Body	Meaning
200	RightSpecificationList	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.4.2 POST /rights/specs

Create RightSpecification. Create a new right specification.

Item	Value
Operation id	`create-right_specs`
Origin	APDS 4.1 native route
Scopes	po
Request body	RightSpecification

Response	Body	Meaning
201	ResponseStatus	Created
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `id-collision` (client-supplied id already exists) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.4.3 GET /rights/specs/{id}

Get RightSpecification. Returns the latest version of a given right specification by its identifier (or the specific version provided as a query parameter).

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Item	Value
Operation id	`get-right_spec`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the right specification.
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to a right specification that should be included in the result set.

Response	Body	Meaning
200	RightSpecification	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.4.4 PUT /rights/specs/{id}

Update RightSpecification. Update an existing right specification

Item	Value
Operation id	`update-right_spec`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	RightSpecification / RightSpecificationChangePayload

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the right specification.
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.

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Response	Body	Meaning
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.4.5 DELETE /rights/specs/{id}

Delete RightSpecification. Delete an existing right specification using its identifier.

Item	Value
Operation id	`delete-right_spec`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the right specification.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.5 Rate Tables

Method	Path	Summary	Scopes
GET	`/rates`	List RateTables	`po sp ep ad`
POST	`/rates`	Create RateTable	`po`
GET	`/rates/{id}`	Get RateTable	`po sp ep ad`
PUT	`/rates/{id}`	Update RateTable	`po`
DELETE	`/rates/{id}`	Delete RateTable	`po`

7.5.1 GET /rates

List RateTables. Returns a list of rate potentially filtered by a combination of : * **latitude**, **longitude** and **radius** : retrieve all rates used in a geographic area (via their associated assigned rights and place), * a list of **places** : retrieve all rates connected to assigned rights that belong to any of the given places, * a list of **right specifications** : retrieve all rates connected to any of the given right specifications, * **issuer** : the id of the rate responsible party (i.e. the issuer of the rate table) * **modified_since** : retrieve all rates that have changed from that given instant onwards, * **expand** : a comma-separated list of optional object attributes associated to a rate that should be included in the result set.

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Item	Value
Operation id	`get-rates`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`right_spec`	query	no	array of string	Comma-separated list of unique right specification ids according to the requested types.
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`expand`	query	no	array of string	Comma-separated list of optional attributes associated to a rate that should be included in the result set.
`issuer`	query	no	string	id of the entity that issued the returned records
`page`	query	no	integer	The page number for paginated responses.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).

Response	Body	Meaning
200	RateTableList / ChangeFeedPage	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	mode=change only: the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set) — problem type `target-not-found`; re-sync with mode=full (Part 5 §5.2 rules 2 and 5). The cursor is an APX parameter, so this refusal is always a Problem.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.5.2 POST /rates

Create RateTable. Create a new rate table.

Item	Value
Operation id	`create-rate`
Origin	APDS 4.1 native route
Scopes	`po`

Item	Value
Request body	RateTable

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	RateTable can not be created due to invalid or missing data. APX: with `Accept: application/problem+json`, problem type `invalid-request`.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	RateTable can not be created due to conflict (id already exists). APX: with `Accept: application/problem+json`, problem type `id-collision`.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.5.3 GET /rates/{id}

Get RateTable. Returns the latest version of a given rate table by its identifier (or the specific version provided as a query parameter).

Item	Value
Operation id	`get-rate`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the rate table.
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.
`expand`	query	no	array of string	Comma-separated list of optional attributes associated to a rate that should be included in the result set.

Response	Body	Meaning
200	RateTable	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.5.4 PUT /rates/{id}

Update RateTable. Update an existing rate table using its identifier, by providing new attributes.

Item	Value
Operation id	`update-rate`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	RateTable / RateTableChangePayload

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Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the rate table.
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.5.5 DELETE /rates/{id}

Delete RateTable. Delete an existing rate table using its identifier.

Item	Value
Operation id	`delete-rate`
Origin	APDS 4.1 native route
Scopes	`po`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the rate table.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

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7.6 Sessions

Method	Path	Summary	Scopes
GET	`/sessions`	List Sessions	`po` `sp` `ep` `ad`
POST	`/sessions`	Create Session	`sp`
GET	`/sessions/{id}`	Get Session	`po` `sp` `ep` `ad`
PUT	`/sessions/{id}`	Update Session	`sp`
DELETE	`/sessions/{id}`	Delete Session	`sp`

7.6.1 GET /sessions

List Sessions. Returns a list of sessions potentially filtered by a combination of : * **latitude**, **longitude** and **radius** : retrieve all sessions occurring in a geographic area (via their associated place), * a list of **Places** : retrieve all sessions connected to any of the given places, * a list of **RightSpecifications** : retrieve all sessions with segments using any of the given right specifications, * a list of **Credentials** : retrieve all sessions linked to the given credentials, * **start_before** : retrieve all sessions starting before that given instant, * **end_before** : retrieve all sessions ending before that given instant, * **start_after** : retrieve all sessions starting after that given instant, * **end_after** : retrieve all sessions ending after that given instant, * **modified_since** : retrieve all sessions that have changed from that given instant onwards, * **expand** : a comma-separated list of optional object attributes associated to a session or its segment.s that should be included in the result set.

Item	Value
Operation id	`get-sessions`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`type`	query	no	array of HierarchyElementTypeEnum	Comma-separated list of place types to consider. All will be assumed if parameter is not used or left blank.
`credential_id`	query	no	array of string	Comma-separated list of unique credential ids according to the requested types.
`credential_type`	query	no	array of CredentialTypeEnum	Comma-separated list of credential types to consider. All will be assumed if parameter is not used or left blank.
`right_spec`	query	no	array of string	Comma-separated list of unique right specification ids according to the requested types.
`right_type`	query	no	array of RightSpecificationTypeEnum	Comma-separated list of right specification types to consider. All will be assumed if parameter is not used or left blank.
`start_before`	query	no	integer	Unix epoch **instant** to filter results starting before the given instant.
`end_before`	query	no	integer	Unix epoch **instant** to filter results ending before the given instant.
`start_after`	query	no	integer	Unix epoch **instant** to filter results starting after the given instant.

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Parameter	In	Required	Type	Description
`end_after`	query	no	integer	Unix epoch **instant** to filter results ending after the given instant.
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`expand`	query	no	array of string	Comma-separated list of optional attributes associated to a session or its segment.s that should be included in the result set.
`page`	query	no	integer	The page number for paginated responses.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).

Response	Body	Meaning
200	SessionList / ChangeFeedPage	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	mode=change only: the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set) — problem type `target-not-found`; re-sync with mode=full (Part 5 §5.2 rules 2 and 5). The cursor is an APX parameter, so this refusal is always a Problem.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.6.2 POST /sessions

Create Session. Creates a new session, along with one or more segment.s. It also allows the creation of assigned rights, for scenarios in which they must be created simultaneously (e.g. off-street and on-street short stays).

Item	Value
Operation id	`create-session`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	Session

Response	Body	Meaning
201	ResponseStatus	Created
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

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Response	Body	Meaning
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `id-collision` (client-supplied id already exists), or `read-already-bound` (a read in `apds-ext:apx:session-detail@1.0` is bound as `entry` or `exit` to another Session of the same place that the write does not name in `supersedes`, Part 5 §5.8 rule 2), instead of ResponseStatus; nothing is written.
422	Problem	The Session's `apds-ext:apx:session-detail@1.0` breaks a consistency rule of Part 5 §5.8 — more than one `representative` read, `lifecycle` `open` with an `actualEnd` or any other `lifecycle` without one, or a `parent` whose `hierarchyElement` is not an ancestor of this Session's (problem type `request-unprocessable`); or a read naming no Observation visible to the caller (`reference-unknown`). Nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.6.3 GET /sessions/{id}

Get Session. Returns the latest version of a given session by its identifier (or the specific version provided as a query parameter).

Item	Value
Operation id	`get-session`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the session.
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.
`expand`	query	no	array of string	Comma-separated list of optional attributes associated to a session or its segment.s that should be included in the result set.

Response	Body	Meaning
200	Session	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.6.4 PUT /sessions/{id}

Update Session. Updates an existing session using its identifier, by providing new attributes. Segments may also be deleted by removing them from the list of segments in the session.

Item	Value
Operation id	`update-session`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	Session / SessionChangePayload

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Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the session.
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`), or `read-already-bound` (a read in `apds-ext:apx:session-detail@1.0` is bound as `entry` or `exit` to another Session of the same place that the write does not name in `supersedes`, Part 5 §5.8 rule 2), instead of ResponseStatus; nothing is written.
422	Problem	The Session's `apds-ext:apx:session-detail@1.0` breaks a consistency rule of Part 5 §5.8 — more than one `representative` read, `lifecycle` `open` with an `actualEnd` or any other `lifecycle` without one, or a `parent` whose `hierarchyElement` is not an ancestor of this Session's (problem type `request-unprocessable`); or a read naming no Observation visible to the caller (`reference-unknown`). Nothing is written.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.6.5 DELETE /sessions/{id}

Delete Session. Deletes an existing session using its identifier. segments should be deleted by updating the session instead.

Item	Value
Operation id	`delete-session`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the session.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).

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Response	Body	Meaning
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.7 Assigned Rights

Method	Path	Summary	Scopes
GET	`/rights/assigned`	List AssignedRights	`po` `sp` `ep` `ad`
POST	`/rights/assigned`	Create AssignedRight	`sp`
GET	`/rights/assigned/{id}`	Get AssignedRight	`po` `sp` `ep` `ad`
PUT	`/rights/assigned/{id}`	Update AssignedRight	`sp`
DELETE	`/rights/assigned/{id}`	Delete AssignedRight	`sp`

7.7.1 GET /rights/assigned

List AssignedRights. Returns a list of assigned rights potentially filtered by a combination of : * **latitude**, **longitude** and **radius** : retrieve all assigned rights occurring in a geographic area (via their associated place) * a list of **places** : retrieve all assigned rights connected to any of the given places, * a list of **right specifications** : retrieve all assigned rights with segments using any of the given right specifications, * a list of **credentials** : retrieve all assigned rights linked to the given credentials, * **start_before** : retrieve all assigned rights starting before that given instant, * **end_before** : retrieve all assigned rights ending before that given instant, * **start_after** : retrieve all assigned rights starting after that given instant, * **end_after** : retrieve all assigned rights ending after that given instant, * **modified_since** : retrieve all assigned rights that have changed from that given instant onwards, * **expand** : a comma-separated list of optional object attributes associated to an assigned right that should be included in the result set.

Item	Value
Operation id	`get-assigned_rights`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`type`	query	no	array of HierarchyElementTypeEnum	Comma-separated list of place types to consider. All will be assumed if parameter is not used or left blank.
`credential_id`	query	no	array of string	Comma-separated list of unique credential ids according to the requested types.
`credential_type`	query	no	array of CredentialTypeEnum	Comma-separated list of credential types to consider. All will be assumed if parameter is not used or left blank.
`right_spec`	query	no	array of string	Comma-separated list of unique right specification ids according to the requested types.

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Parameter	In	Required	Type	Description
`right_type`	query	no	array of RightSpecificationTypeEnum	Comma-separated list of right specification types to consider. All will be assumed if parameter is not used or left blank.
`start_before`	query	no	integer	Unix epoch **instant** to filter results starting before the given instant.
`end_before`	query	no	integer	Unix epoch **instant** to filter results ending before the given instant.
`start_after`	query	no	integer	Unix epoch **instant** to filter results starting after the given instant.
`end_after`	query	no	integer	Unix epoch **instant** to filter results ending after the given instant.
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to an assigned right that should be included in the result set.
`page`	query	no	integer	The page number for paginated responses.
`mode`	query	no	string (full, change)	APX change feed (Part 5 §5.2): `full` (default — the route's ordinary list; on a native APDS route, exactly stock APDS 4.1) or `change` (the changes after `cursor`: a ChangeFeedPage on a native route, the route's own list envelope with the change-page members on an APX list route, rule 8; on an APX list route without a cursor, an empty page holding the current head cursor).
`cursor`	query	no	string	Opaque change-feed cursor from a previous change page. Only meaningful with `mode=change`; a refused cursor is 404 `target-not-found` (Part 5 §5.2 rules 2 and 5).

Response	Body	Meaning
200	AssignedRightList / ChangeFeedPage	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	Problem	mode=change only: the cursor is unknown, older than the retention window, or was issued for another (class, credential, filter set) — problem type `target-not-found`; re-sync with mode=full (Part 5 §5.2 rules 2 and 5). The cursor is an APX parameter, so this refusal is always a Problem.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.7.2 POST /rights/assigned

Create AssignedRight. Create a new assigned right based on a given object.

Item	Value
Operation id	`create-assigned_right`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	AssignedRight / ReferenceToQuote

Response	Body	Meaning
201	ResponseStatus	Created

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Response	Body	Meaning
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `id-collision` (client-supplied id already exists) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.7.3 GET /rights/assigned/{id}

Get AssignedRight. Returns the latest version of a given assigned right by its identifier (or a specific version provided as a query parameter).

Item	Value
Operation id	`get-assigned_right`
Origin	APDS 4.1 native route
Scopes	`po`, `sp`, `ep`, `ad`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the assigned right.
`version`	query	no	integer	Previous version number. Useful when a reference to a resource version is found in another dataset, and that version is no longer the latest one. Latest version is assumed when this parameter is not used.
`expand`	query	no	array of string	Comma-separated list of optional object attributes associated to an assigned right that should be included in the result set.

Response	Body	Meaning
200	AssignedRight	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.7.4 PUT /rights/assigned/{id}

Update AssignedRight. Update an existing assigned right using its identifier, by providing new attributes. If the provided quote refers to a session extension, this request shall also update the referenced session.

Item	Value
Operation id	`update-assigned_right`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	AssignedRight / AssignedRightChangePayload

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the assigned right.

Parameter	In	Required	Type	Description
`APX-Update-Mode`	header	no	string (full, change)	APX data profile (Part 5 §5.1). `full` (default, stock APDS behavior): the body is the complete current state. `change`: the body is a ChangePayload — identity plus only the changed members; absent = unchanged, explicit null = clear. A stale `version` in change mode is 409 `version-conflict`.

Response	Body	Meaning
200	ResponseStatus	OK
201	ResponseStatus	Created
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	AssignedRight can not be updated as it has not been found (servers that upsert answer 201 instead). APX: with `Accept: application/problem+json`, problem type `target-not-found`.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `version-conflict` (stale `version`) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.7.5 DELETE /rights/assigned/{id}

Delete AssignedRight. Delete an existing assigned right using its identifier.

Item	Value
Operation id	`delete-assigned_right`
Origin	APDS 4.1 native route
Scopes	`sp`
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	Unique identifier for the assigned right.

Response	Body	Meaning
200	ResponseStatus	OK
400	ResponseStatus	Bad Request. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `invalid-request` (with `errors[]`) instead of ResponseStatus.
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
409	ResponseStatus	Conflict. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives the most specific registered problem type (Part 12 §12.4) instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.8 Quote

Method	Path	Summary	Scopes
GET	`/quotes`	get quotes	

Method	Path	Summary	Scopes
POST	`/quotes`	create quote request	
GET	`/quotes/{id}`	get details of a specific quote	

7.8.1 GET /quotes

get quotes. get quotes matching specified criteria

Item	Value
Operation id	`get-quote`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`latitude`	query	no	number float	Location latitude to use as filter (mandatory if **longitude** and **radius** are defined)
`longitude`	query	no	number float	Location longitude to use as filter (mandatory if **latitude** and **radius** are defined)
`radius`	query	no	integer	Number of metres to use as search filter from given position (mandatory if **latitude** and **longitude** are defined)
`modified_since`	query	no	integer	Unix epoch **instant** to filter results that have changed or have been deleted after the given instant. If **expand** attributes are requested, then this parameter will also apply to those objects. When this attribute is used, the result set will also include a list of deleted references to avoid storing stale data.
`place`	query	no	array of string	Comma-separated list of unique place ids according to the requested types.
`right_spec`	query	no	array of string	Comma-separated list of unique right specification ids according to the requested types.
`quote_type`	query	no	string (QuoteRightRequest, QuoteRightResponse, QuoteSessionExtensionRequest, QuoteSessionExtensionResponse)	

Response	Body	Meaning
200	QuoteRightRequest / QuoteRightResponse / QuoteSessionExtensionRequest / QuoteSessionExtensionResponse	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.8.2 POST /quotes

create quote request. submit a request for a quote

Item	Value
Operation id	`post-quote`
Origin	APDS 4.1 native route

Item	Value
Scopes	none
Request body	QuoteRightRequest / QuoteSessionExtensionRequest

Response	Body	Meaning
200	PaginatedListMeta / object	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

7.8.3 GET /quotes/{id}

get details of a specific quote. get details of quote identified by `id`

Item	Value
Operation id	`get-quote-id`
Origin	APDS 4.1 native route
Scopes	none
Request body	—

Parameter	In	Required	Type	Description
`id`	path	yes	string	unique id of the quote

Response	Body	Meaning
200	QuoteRightRequest / QuoteRightResponse / QuoteSessionExtensionRequest / QuoteSessionExtensionResponse	OK
401	Problem	Missing, malformed, expired, or revoked access token (problem type `unauthenticated`, Part 12).
403	Problem	Insufficient scope (problem type `insufficient-scope`) or place grant (`insufficient-grant`) for this operation (Part 9).
404	ResponseStatus	Not Found. APX (Part 5 §5.1a, Part 12 §12.1): a client sending `Accept: application/problem+json` receives problem type `target-not-found` instead of ResponseStatus.
429	Problem	Rate limited (problem type `rate-limited`, Part 12).

Annex S (informative) Security schemes and scopes

Scopes are defined in the OpenAPI security schemes below and explained in APX Part 9. As elsewhere in this document, the OpenAPI document wins where the two differ.

Scheme	Scope	Meaning
oAuth	`po`	Parking Operator
oAuth	`sp`	Service Provider
oAuth	`ep`	Enforcement Provider
oAuth	`ad`	Administrator
apxOAuth	`apx.data:read`	Read parking data via APDS-native routes
apxOAuth	`apx.data:write`	Create/update parking data via APDS-native routes
apxOAuth	`apx.control:read`	Read commands, lanes, and device status

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Scheme	Scope	Meaning
apxOAuth	`apx.control:execute`	Execute commands (vend gate, lost ticket, push rate, apply validation…)
apxOAuth	`apx.alerts:read`	Read alerts
apxOAuth	`apx.alerts:write`	Raise, acknowledge, and resolve alerts
apxOAuth	`apx.subscriptions:manage`	Create and manage event subscriptions
apxOAuth	`apx.accounts:read`	Look up accounts and balances
apxOAuth	`apx.payments:write`	Take payments and post accounting write-backs
apxOAuth	`apx.lpr:read`	LPR plate/ticket cross-lookup
apxOAuth	`apx.reservations:manage`	Quote, book, amend, cancel reservations
apxOAuth	`apx.permits:manage`	Issue and manage permits
apxOAuth	`apx.tolling:manage`	Create and manage toll transactions
apxOAuth	`apx.resolution:read`	Resolve and read customer-service resolution contexts and allowed actions
apxOAuth	`apx.support:manage`	Record and read support-interaction history
apxOAuth	`apx.violations:read`	Read violations and run the enforcement eligibility check
apxOAuth	`apx.violations:manage`	Create, review, issue, settle, appeal, and void violations
apxOAuth	`apx.validations:read`	Read validation programs, issuances, redemptions, and statements
apxOAuth	`apx.validations:manage`	Enrol and update programs, issue stock, reverse redemptions, close statements
apxOAuth	`apx.validations:redeem`	Merchant scope — check codes, issue own stock, record redemptions, read own programs and statements (limited to the token's apx_org)
apxOAuth	`apx.credentials:read`	Read credentials and their access-event history
apxOAuth	`apx.credentials:manage`	Issue, activate, suspend, resume, report lost, revoke, and replace credentials
apxOAuth	`apx.valet:read`	Read valet tickets and the retrieval queue
apxOAuth	`apx.valet:manage`	Take custody, park, stage, hand back, and manage retrievals
apxOAuth	`apx.valet:request`	Customer scope — request or cancel retrieval and read status/ETA for the caller's own ticket (text, app, web, voice bot)
apxOAuth	`apx.platelists:read`	Read plate lists and their entries, plate values included (Part 24)
apxOAuth	`apx.platelists:manage`	Create and maintain plate lists and entries (Part 24)
apxOAuth	`apx.ui:launch`	Open a vendor screen for an agent and read the launches it issued (Part 25)
apxOAuth	`apx.ui:read`	Read UI launches and the actions recorded in them (Part 25)
apxOAuth	`apx.ui:record`	The surface's own scope; record actions done in a launched screen and close it (Part 25)
apxOAuth	`apx.siteconfig:read`	Read a place's equipment, cameras, comms points, display records and external ids; resolve another system's id (Part 26)
apxOAuth	`apx.siteconfig:manage`	Add, replace and remove comms points (Part 26)
apxOAuth	`apx.cameras:view`	Obtain short-lived camera view links, logged against the agent (Part 26)
apxOAuth	`apx.displays:record`	The scope of the system that drives a sign; record that a message was shown (Part 26 §26.9)
apxOAuth	`apx.compliance:read`	Read the stay-compliance status on Sessions; without it the decoration is left out (Part 5 §5.9)
apxOAuth	`apx.compliance:write`	Write the stay-compliance status on Sessions, beside the Session write scope (Part 5 §5.9)
apxOAuth	`apx.digest:use`	Receive the credential digest keys (Part 9 §9.6 rule 6)
apxOAuth	`apx.replication:write`	Replay another implementation's records with their original provenance and lifecycle times (Part 18 §18.6)
apxOAuth	`apx.charging:read`	read charging-point status (with bay presence) and charging sessions
apxOAuth	`apx.charging:manage`	bridge scope; push point availability, bay observations, open sessions, report timeline events, attach settlement

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Scheme	Scope	Meaning
apxOAuth	`apx.charging:status`	customer scope; minimized read of the caller's own charging session and the place's charger availability (app, text, voice bot)

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