API & Integrations

Downloadable reference generated from the NetOS Markdown documentation.

Xiber NetOS — API & Integrations Guide

> REST API endpoints, MCP tools, and external system integration map.

REST API

SETTING	VALUE
Base URL	`http://localhost:8000/api/v1`
Demo Base URL	`https://netos.xiberian.net/api/v1`
Docs (Swagger)	`http://localhost:8000/docs`
OpenAPI Schema	`http://localhost:8000/openapi.json`
Content Type	`application/json`

Authentication (Development)

Pass a role header on every request:

```
x-user-role: exec
```

Valid roles: `exec`, `finance`, `network_eng`, `operations`, `pm`, `sales`, `read_only`, `agent`

Production will use Microsoft Entra OIDC JWT tokens. See Public Hostname & SSO.

Endpoints

Health Check

```
GET /healthz
```

```
{"status": "ok"}
```

No authentication required.

List Circuits

```
GET /api/v1/circuits
```

Query Parameters:

PARAM	TYPE	DESCRIPTION
`carrier`	string	Filter by carrier name
`status`	string	Filter by status enum
`search`	string	Full-text search across circuit label, carrier circuit ID, carrier name

Response: Array of circuit objects with nested carrier, contract, A endpoint, and Z endpoint data.

Example:

```
curl -H "x-user-role: exec" \
  "http://localhost:8000/api/v1/circuits?status=active&carrier=Lumen"
```

Get Circuit Detail

```
GET /api/v1/circuits/{circuit_id}
```

Response includes:

- Circuit attributes (label, carrier circuit ID, service type, bandwidth, status, MRC, NRC)
- Carrier details (name, NOC phone, portal URL)
- Contract details (term dates, renewal type, ETF, escalator)
- A and Z endpoints (name, address, coordinates)
- Exact monitoring URL and generated monitoring search fallback
- Provider portal URL
- Lifecycle events (ordered by date)

Create Circuit

```
POST /api/v1/circuits
```

Requires: Write role (`exec`, `finance`, `network_eng`, `operations`, `pm`)

Request Body:

```
{
  "xiber_circuit_label": "XIB-LUM-0042",
  "carrier_circuit_id": "DHEC.123456",
  "carrier_name": "Lumen",
  "service_type": "wave",
  "bandwidth_mbps": 10000,
  "status": "active",
  "monitoring_url": "https://librenms.xiber.local/device/123",
  "mrc_usd": 2500.00,
  "nrc_usd": 5000.00,
  "a_endpoint_name": "Xiber HQ",
  "z_endpoint_name": "Cologix COL1"
}
```

The manual UI now uses Infrastructure and Customer site selectors for circuit A/Z locations. The REST API still accepts endpoint fields so imports and integrations can create endpoint snapshots. For attribution, creating a circuit is not enough by itself; create a `subtended_links` relationship to state which infrastructure asset is the upstream donor and which downstream structure or customer endpoint is served over that circuit.

For DIA and broadband services, NetOS treats the circuit as single-site and clears the Z endpoint.

Customer, RF Link, Electrical, and Attribution APIs

Customers

```
GET /api/v1/customers
POST /api/v1/customers
GET /api/v1/customers/{customer_id}
PATCH /api/v1/customers/{customer_id}
DELETE /api/v1/customers/{customer_id}
```

Customer records represent commercial and MFC customer sites. They can be selected by circuits, RF Links, and subtended links. Customer detail responses include associated circuits, RF Links, serving paths, inherited donor cost, customer revenue, attributed cost, and gross margin.

RF Links

```
GET /api/v1/rf-links
POST /api/v1/rf-links
PATCH /api/v1/rf-links/{rf_link_id}
DELETE /api/v1/rf-links/{rf_link_id}
POST /api/v1/rf-links/{rf_link_id}/documents
```

RF Links are built from existing infrastructure and customer sites. Links between two infrastructure assets are backhaul. Links from infrastructure to a customer site are customer endlinks. When a customer endlink is saved, NetOS synchronizes the matching subtended customer endpoint relationship so attribution can show RF transport.

RF System Catalog

```
GET /api/v1/rf-systems
POST /api/v1/rf-systems
PATCH /api/v1/rf-systems/{rf_system_id}
DELETE /api/v1/rf-systems/{rf_system_id}
```

RF systems define selectable defaults such as name, description, frequency used, capacity, cost, PTP/PtMP type, equipment role, and PtMP compatibility. PtMP source nodes must reference RF systems with role `ptmp_base`. PtMP customer RF Links must reference a subscriber/client RF system with role `ptmp_subscriber`; if the subscriber has compatible base system IDs, the selected PtMP source node's base system must be included.

Electrical Services

```
GET /api/v1/electrical-services
POST /api/v1/electrical-services
PATCH /api/v1/electrical-services/{electrical_service_id}
DELETE /api/v1/electrical-services/{electrical_service_id}
POST /api/v1/electrical-services/{electrical_service_id}/documents
```

Electrical services attach to exactly one Infrastructure or Customer site. They store provider, service type, account and meter numbers, voltage, amperage, phase, delivery location, service address, average monthly cost, start date, monitoring URL, notes, and supporting documents.

Infrastructure Subtended Links

```
POST /api/v1/infrastructure/{infrastructure_id}/subtended-links
PATCH /api/v1/infrastructure/{infrastructure_id}/subtended-links/{link_id}
DELETE /api/v1/infrastructure/{infrastructure_id}/subtended-links/{link_id}
```

Subtended links explicitly define the financial hierarchy. Use them to attach customer endpoints, downstream structures, existing circuits, or RF Links to a parent infrastructure asset. This is what drives the attribution tree, dashboard attribution cards, customer inherited-cost drilldowns, and infrastructure financial summaries.

Bulk Update Circuits

```
PATCH /api/v1/circuits/bulk
```

Requires: Write role (`exec`, `finance`, `network_eng`, `operations`, `pm`)

Request Body:

```
{
  "circuit_ids": ["8d8e4333-8182-4443-8e0d-f2307276db52"],
  "updates": {
    "status": "active",
    "carrier_name": "Lumen",
    "service_type": "dia",
```

```
    "mrc_usd": 1850.00,
    "nrc_usd": 0,
    "contract_term_end_date": "2027-12-31",
    "notes": "Updated through bulk action"
  }
}
```

Only fields included in `updates` are changed. Each affected circuit receives an audit entry.

Response:

```
{"updated": 1, "requested": 1}
```

Bulk Delete Circuits

```
POST /api/v1/circuits/bulk-delete
```

Soft-deletes circuits by setting `deleted_at`. Records remain available for audit and historical reporting.

Request Body:

```
{
  "circuit_ids": ["8d8e4333-8182-4443-8e0d-f2307276db52"]
}
```

Response:

```
{"deleted": 1, "requested": 1}
```

Map Data

```
GET /api/v1/circuits/map
```

Query Parameters:

PARAM	TYPE	DESCRIPTION
`carrier`	string	Filter by carrier
`service_type`	string	Filter by service type enum
`status`	string	Filter by status enum
`state`	string	Filter by endpoint state (US state)

Response:

```
{
  "circuits": [
    {
      "id": "uuid",
      "label": "XIB-LUM-0042",
      "carrier": "Lumen",
      "service_type": "wave",
      "bandwidth_mbps": 10000,
      "status": "active",
      "a_endpoint": {"name": "...", "lat": 39.96, "lng": -82.99},
      "z_endpoint": {"name": "...", "lat": 39.95, "lng": -83.00},
      "geometry": {"type": "LineString", "coordinates": [[-82.99, 39.96], [-83.00, 39.95]]}
    }
  ],
  "endpoints": [
    {
      "id": "uuid",
      "name": "Xiber HQ",
      "type": "pop",
      "geometry": {"type": "Point", "coordinates": [-82.99, 39.96]}
    }
  ],
  "infrastructure": [
    {
      "id": "uuid",
      "name": "Cologix COL1",
      "type": "data_center",
      "geometry": {"type": "Point", "coordinates": [-83.00, 39.95]}
    }
  ],
  "filters": {
    "carriers": ["Lumen", "Zayo", "Cogent"],
    "service_types": ["wave", "dia", "dark_fiber"],
    "statuses": ["active", "ordered"],
    "states": ["OH", "GA", "IL"]
  }
}
```

Dashboard Summary

```
GET /api/v1/dashboard/summary
```

Response includes:

SECTION	FIELDS
`kpis`	total_circuits, active_circuits, infrastructure_count, circuit_mrc, facility_mrc, total_mrc, modeled_mrr, modeled_margin, renewal_window_count
`spend_by_carrier`	Array of {carrier, mrc, circuit_count}
`service_mix`	Array of {service_type, count}
`state_mix`	Array of {state, count}
`renewal_pipeline`	Array of {state, count}

SECTION	FIELDS
`margin_histogram`	Array of {bucket, count}
`at_risk_circuits`	Array of circuit summaries
`top_expensive`	Array of circuit summaries
`lowest_margin`	Array of circuit summaries

Import Preview

```
POST /api/v1/imports/circuits/preview
Content-Type: multipart/form-data
```

Upload a CSV or XLSX file. Returns import job ID, detected column mapping, headers, sample rows, and validation summary.

Example:

```
curl -H "x-user-role: exec" \
  -F "file=@examples/sample_circuits.csv" \
  http://localhost:8000/api/v1/imports/circuits/preview
```

Import Commit

```
POST /api/v1/imports/circuits/{import_job_id}/commit
```

Commits all valid staged rows. Returns insert/update/invalid counts.

Example:

```
curl -H "x-user-role: exec" \
  -X POST \
  http://localhost:8000/api/v1/imports/circuits/{import_job_id}/commit
```

List Service Providers

```
GET /api/v1/service-providers
```

Returns carrier records with circuit count, infrastructure count, and total spend.

Get Service Provider

```
GET /api/v1/service-providers/{carrier_id}
```

Returns provider detail with related circuits and infrastructure assets.

List Infrastructure Assets

```
GET /api/v1/infrastructure
```

Returns infrastructure asset records with facility type, provider, costs, terms, and `monitoring_url`.

Bulk Update Infrastructure Assets

```
PATCH /api/v1/infrastructure/bulk
```

Request Body:

```
{
  "infrastructure_ids": ["ae30e22f-565d-46f3-be94-9d0e001a59de"],
  "updates": {
    "status": "active",
    "provider_name": "American Tower",
    "site_type": "tower",
    "mrc_usd": 2200.00,
    "price_escalator_pct": 3.0,
    "term_end_date": "2028-12-31",
    "notes": "Updated through bulk action"
  }
}
```

Only fields included in `updates` are changed. Each affected asset receives an audit entry.

Response:

```
{"updated": 1, "requested": 1}
```

Bulk Delete Infrastructure Assets

```
POST /api/v1/infrastructure/bulk-delete
```

Soft-deletes infrastructure assets by setting `deleted_at`.

Request Body:

```
{
  "infrastructure_ids": ["ae30e22f-565d-46f3-be94-9d0e001a59de"]
}
```

Response:

```
{"deleted": 1, "requested": 1}
```

Audit Activity

```
GET /api/v1/audit/activity
```

Returns recent request/write activity including user, role, IP, event type, action, entity, changed fields, and response status.

Feedback Queue

```
GET /api/v1/feedback
POST /api/v1/feedback
PATCH /api/v1/feedback/{feedback_id}
POST /api/v1/feedback/{feedback_id}/comments
```

Feedback requests support `priority`, `status`, and progress comments. Public comments attempt to notify the requester by email when SMTP is configured.

MCP Server

Location: `apps/mcp/`

The MCP server exposes NetOS data to XOS agents (ExecOS, department agents, Claude Desktop users).

Current Tools

TOOL	STATUS	DESCRIPTION
`list_circuits`	Working	List circuits with optional filters
`get_circuit`	Working	Get single circuit detail
`get_renewals_due`	Placeholder	Circuits approaching renewal deadline
`get_etf_exposure`	Placeholder	ETF exposure by carrier or portfolio

Planned Tools

TOOL	DESCRIPTION
`get_carrier_summary`	Carrier spend, circuit count, ETF exposure
`get_circuit_pl`	Per-circuit P&L with revenue attribution
`find_circuits_at_address`	Find circuits near or at an address
`get_outage_history`	Outage events for a circuit
`get_renewal_pipeline`	All circuits by renewal state
Write tools	Create/update with explicit agent confirmation flow

Authentication

MCP tools use role-based header auth matching the REST API:

```
x-user-role: agent
```

In production, MCP requests will carry a service token validated against the gateway's agent registry.

Registration with XOS Gateway

The MCP server should be registered with the Xiber MCP Gateway (`gateway.xiberian.net`) so it's available to all XOS agents and Claude Desktop users via the SSE bridge. This is not yet configured.

External System Integration Map

SYSTEM	DIRECTION	PURPOSE	STATUS
Sonar	Pull	Customer accounts, MRR, revenue attribution per circuit	Planned
Monday.com	Bidirectional	Renewal tasks, variance tasks, circuit order workflow	Planned
Wisdm	Pull	Tower and network site geometry for map overlays	Planned
LibreNMS / Prometheus / Loki	Pull	Utilization data, outage detection, monitoring deep links	Planned
DocuSeal	Push	Generate termination notices and contract execution envelopes	Planned
Microsoft 365 / Entra ID	Pull	SSO, user identity, calendar/Teams/SharePoint references	Planned
XOS (MCP Gateway)	Expose	Agent-readable circuit tools for automated reporting and decisions	Skeleton
Lumen Control Center	Pull	Circuit status sync from carrier portal	Not started
Zayo Tranzact	Pull	Circuit status sync from carrier portal	Not started
Cogent Portal	Pull	Circuit status sync from carrier portal	Not started

Planned Webhooks (Outbound)

EVENT	TRIGGER	DESTINATION
`circuit.installed`	Circuit status → `active`	Monday.com, Slack
`circuit.decommissioned`	Circuit status → `decommissioned`	Monday.com, Slack
`renewal.state_changed`	Renewal state transition	Monday.com, Email, Slack
`invoice.variance_detected`	Invoiced MRC ≠ contracted MRC	Monday.com (task for finance)

Webhooks are not yet implemented.