

User Manual

Downloadable reference generated from the NetOS Markdown documentation.

Xiber NetOS — User Manual

Daily usage guide for the NetOS web interface.

What NetOS Does

NetOS is Xiber's system of record for **wholesale network lifecycle management**. It tracks:

- Carrier circuits (waves, EPL, DIA, dark fiber, cross-connects, etc.)
- Infrastructure assets (data centers, towers, colos, rooftops, carrier hotels)
- Carrier/provider relationships and contacts
- Contract terms, renewal windows, and ETF exposure
- Lifecycle history (orders, installs, upgrades, outages, renewals)

What it does NOT do: end-customer billing (Sonar), device monitoring (LibreNMS), or network design (Wisdm).

Navigation

The left sidebar contains all views:

VIEW	URL	DESCRIPTION
Circuits	<code>/circuits</code>	Main circuit list with search, filters, bulk edit, and soft-delete
RF Links	<code>/rf-links</code>	Wireless link inventory with equipment, spectrum, cost, rent, endpoints, and FCC license documents
Electrical	<code>/electrical-services</code>	Utility service inventory attached to infrastructure or customer sites
Customers	<code>/customers</code>	Commercial and MFC customer records used by circuits, RF Links, and subtended endpoints
Map	<code>/map</code>	Geographic view of circuits and infrastructure
Dashboard	<code>/dashboard</code>	KPIs, spend analysis, renewal pipeline
Alerts	<code>/alerts</code>	Problem inventory records that need cleanup before maps, topology, attribution, or reporting can be trusted

VIEW	URL	DESCRIPTION
Timeline	/timeline	Contract-term Gantt chart
Topology	/topology	Endpoint relationship graph with SPOF detection
Providers	/providers	Carrier database with contacts and spend
Infrastructure	/infrastructure	Non-circuit assets (towers, colos, DCs)
Financial	/financial	Per-circuit P&L, modeled revenue, margin, ETF exposure, and carrier rollups
Address	/address	Address-based circuit lookup
Mobile	/mobile	Field-friendly read view with NOC call, copy ID, and map links
Import	/import	CSV/XLSX bulk import
Admin	/admin	Audit activity plus bug and feature request queue
Exports	/exports	Filtered data export *(planned)*

A **global search bar** appears across views. It searches across inventory, not just the current page, and returns recommended matches as you type.

Global search supports partial matches for:

- Circuits by label, carrier circuit ID, service type, status, BAN, billing account, notes, provider, and A/Z site names or geography
- RF Links by link label, status, equipment, spectrum, FCC call sign, A/Z sites, customer endpoint, and notes
- Infrastructure by site name, Xiber label, site type, account, address, provider, and notes
- Customers by customer name, property name, customer type, service/access technology, address, contacts, billing account, and notes
- Electrical services by service name, provider, account, meter, delivery location, address, status, and notes
- Providers by provider name, short name, contacts, support/billing details, and ASN

Use the recommended matches dropdown to jump directly to the matching record or inventory page. Page-level filters still apply only to the page currently being viewed.

Circuits

URL: </circuits>

The primary operational list. Columns include:

COLUMN	DESCRIPTION
Xiber Circuit Label	Internal Xiber identifier (click to open detail)
Carrier Circuit ID	The carrier's reference number
Carrier	Upstream provider name
Service Type	wave, epl, evpl, dia, broadband, ip_transit, dark_fiber, etc.

COLUMN	DESCRIPTION
Bandwidth	Capacity in Mbps
Status	quoted, ordered, installing, active, suspended, decommissioned
A Endpoint	Near-end location
Z Endpoint	Far-end location
MRC	Monthly recurring cost
NRC	Non-recurring cost
Term Start / End	Contract period

Click any Xiber circuit label to open the circuit detail page.

The circuit list is grouped by service type. Each service type section can be collapsed so large inventories remain navigable while preserving the existing filters and bulk-selection workflow.

Add or Edit Circuit

The circuit form now uses existing Infrastructure and Customer records as site selectors. Select the A site and, for multi-site services such as EVPL, EPL, wave, dark fiber, MPLS, or cross-connect, select the Z site. NetOS copies the saved site name, address, type, and coordinates into the circuit endpoint record so maps and topology stay consistent with the site inventory.

Circuit labels are generated from the standard pattern `Provider Short Name Service Type A Loc -> Z Loc` when a provider short name exists, otherwise `Carrier Service Type A Loc -> Z Loc`. The add/edit form starts with service type because that selection controls which site fields are needed. For single-site services such as DIA, broadband, and Starlink, the generated label omits the Z location. Users can edit the generated label before saving, but changing carrier, service type, or selected sites refreshes the generated label so circuit names stay consistent.

DIA, broadband, and Starlink are single-site services in NetOS, so the form only asks for one circuit site. If the selected site is a customer record, NetOS also associates that customer to the circuit. Circuit-specific install details such as meet-me room, rack/demarc position, demarc type, site contact, and circuit access notes can still be entered on the circuit because those details may differ from the base site record.

Create or update the Infrastructure or Customer site first when the location, address, or coordinates are missing or wrong. The circuit form should not be used to maintain master site addresses.

Circuit Bulk Actions

Use the checkboxes in the first column to select one or more circuits. The header checkbox selects all currently visible filtered rows.

ACTION	WHAT IT DOES
Apply	Bulk-updates selected circuits using only the fields filled into the bulk action row
Delete	Soft-deletes selected circuits after confirmation

Bulk update fields currently include status, provider, service type, MRC, NRC, term end, and notes. Bulk deletes are soft-deletes: the rows are hidden from normal views but remain in the database for audit and historical reporting.

Each affected circuit receives its own audit entry.

RF Links

URL: `/rf-links`

Use RF Links for PTP, PtMP, Tarana, microwave, and other wireless paths that serve customer endpoints or downstream assets from a POP, tower, rooftop, or facility.

Tracked fields include equipment type, path role, diversity group, frequency, channel width, bandwidth, FCC call sign, license required status, CAPEX, straight-line depreciation inputs, MRC, tower or rooftop rent MRC, install date, A location, Z location, coordinates, notes, and FCC license uploads. Equipment presets can populate common equipment type, link type, default CAPEX, and useful life; users can still edit those values before saving.

RF Links use the same A/Z direction convention as circuits: A is the customer or downstream side, and Z is closer to the donor/core. For customer PtP service, select the customer endpoint and the Z donor facility. For facility-to-facility backhaul, select both A and Z infrastructure facilities.

RF Links can be attached from an infrastructure asset's **Subtended Network** section. When a customer endpoint is served over wireless transport, select the RF link in **RF link serving endpoint**. NetOS uses RF link MRC plus tower rent MRC as calculated monthly link cost unless a manual link cost override is entered.

When adding PtMP customer endlinks, select the PtMP source node first. NetOS shows only mapped customer sites within 10 miles of that sector and only subscriber radios compatible with the selected base/sector system. Select one or more customer endpoints to create multiple PtMP RF Links in one action.

The RF Link list is grouped by BTA market state, BTA, and then city, using the A infrastructure location first and falling back to the Z facility or customer endpoint geography when needed. Cross-state suburbs are consolidated into the parent metro market, such as Newport, KY under OH / Cincinnati BTA. State, BTA, and city sections can be collapsed.

Customers

URL: `/customers`

Customers are first-class records that can be selected from endpoint-style circuits, RF Links, and infrastructure subtended links.

Commercial customer fields include customer name, status, address, coordinates, DIA or PTP service type, DIA/PTP capacity, contracted MRR, install NRC, revenue source, OTT service checkboxes for VoIP, IPTV, managed WiFi, and managed security, contact details, billing account, and notes.

MFC customer fields include property name, tenant count, address, coordinates, contracted MRR, install NRC, property CAPEX, maintenance reserve MRC, revenue source, access technology such as XGSPON, EoC, or ActiveE, property owner, property manager, access rules, contact details, billing account, and notes.

MFC records also include agreement and property-service detail fields. The **MFC Service Agreement** section tracks the agreement signed date, renewal terms, owner termination rights, system ownership terms, and force majeure language. The **MFC Service Scope** section tracks base and maximum in-unit speeds, whether video/IPTV is bulk, retail, both, or not provided, common-area WiFi, mobile carrier offload, IoT coverage, property management office voice, and free-form notes for common-area or other property services.

Use customer selectors instead of free-form customer names when the customer already exists. Free-form customer names remain available for early discovery or incomplete records.

The customer table also shows associated circuits, RF Links, donor POPs/facilities, and protection status so users can see how the customer is served and click through to the serving asset where applicable. Serving paths are sorted with primary paths first and backup, secondary, redundant, or diverse paths underneath so the operating path is always visible before the protection path. MFC sites are flagged as **Protected** when NetOS sees either at least one primary serving path plus at least one backup path, or two or more primary serving paths that represent ring/diverse protection. Backup paths include Broadband, Starlink, cellular backup, circuits with purpose `backup`, or paths explicitly marked secondary, backup, redundant, or diverse. If DIA is the only service at an MFC property, NetOS treats that DIA as the primary path until a Starlink or other backup path is added. Unprotected MFCs are highlighted because the operating standard is to add backup or ring/diverse service where feasible.

The customer table is grouped by customer type, BTA market state, BTA, and city so commercial and MFC sites can be reviewed by both service model and metro market.

Customer add/edit forms warn when **Address line 1** appears to contain the city, state, or ZIP. Split the address into Address line 1, City, State, and Postal code fields so geocoding can create customer coordinates. Customer records are also flagged as unmappable when they have address data but no latitude/longitude after geocoding. Correct the address fields or enter coordinates manually; customers without coordinates cannot render as RF Link endpoints on the map.

When typing a customer or infrastructure site address, NetOS recommends normalized address matches. Choosing a match fills Address line 1, City, State, Postal code, Country, Latitude, and Longitude. Save the record after choosing the suggested address so maps, topology, and RF Link rendering update from the corrected location.

Attribution uses subtended link revenue when entered. If the subtended link has a selected customer and no explicit link revenue, NetOS uses the customer's contracted MRR.

Customer detail pages show attached electrical services alongside serving paths, related objects, a monthly revenue schedule, a collapsible ROI Analysis model, inherited donor cost detail, and a **What If** calculator. The serving path section combines explicit subtended links with directly attached customer circuits and RF Links, then labels each path as **Primary** or **Backup** so Broadband, DIA, Starlink, and secondary paths are visible in the same operating view as the main RF or fiber path. DIA is contextual for MFC sites: when it is the only serving path it is labeled **Primary**, and when another primary path exists it may remain a backup or secondary path if marked that way. Direct customer circuits are limited to customer-facing circuit endpoints or one-ended customer backup services; upstream donor transport that serves a POP, tower, or aggregation facility remains visible under inherited donor cost instead of being listed as a direct customer serving path. Inherited donor cost includes the customer's revenue pro rata share of shared facility MRC and upstream transport paths at each structure in the serving chain. The financial summary breaks out direct serving cost, inherited shared cost, maintenance reserve, commission, revenue escalator, cost

escalator, and ramp assumptions. The monthly schedule shows MRR, escalated serving cost, maintenance reserve, commission, total cost, and margin by month. The calculator lets users compare the customer revenue schedule against a hypothetical Type 2 circuit, alternate RF build, or renewal case by entering monthly transport cost, build CAPEX, monthly OPEX/reserve, install NRC, and commission. The ROI model uses customer MRR, term years, term start/end dates, revenue escalator, ramp months, commission percentage or fixed monthly commission, attributed monthly serving cost, install NRC, RF Link CAPEX when present, customer property CAPEX, maintenance reserve, and 3% annual direct/inherited cost escalation starting in year 2 to project ARR, annual contribution margin, CAPEX/ARR, margin payback, net cash, ROI percentage, IRR, NPV, margin multiple, and payback over 2-, 3-, 5-, and 10-year terms.

Customer detail pages also include **Customer Site Photos & Documents**. Users can upload field photos, screenshots, floorplans, permits, invoices, service agreements, and other supporting documents. Image uploads capture available metadata such as image dimensions, EXIF captured date/time, GPS coordinates, camera/software hints, and file size. When the AI provider is configured, NetOS analyzes images for visible equipment, site conditions, access or safety concerns, detected text, and recommended follow-up. AI analysis is advisory and should be reviewed by the user before operational decisions are made. The gallery search covers filenames, titles, user notes, AI summaries, detected text, visible equipment, and follow-up recommendations, and image records include a **Re-run AI** action when analysis needs to be refreshed.

The customer list is grouped first by customer type, then by state, then by city. Each level can be collapsed to navigate large commercial and MFC inventories.

Alerts

URL: `/alerts`

Alerts collect records that need user cleanup. This is the first place to check when maps, topology, or attribution do not look correct.

Current alert categories include:

- Customers or infrastructure sites with address data but no coordinates
- Customers or infrastructure sites with no mappable address or coordinates
- Address line 1 values that appear to contain city, state, or ZIP data
- Circuits missing required endpoints
- RF Links missing an A site or Z site/customer endpoint
- MFC customers missing contracted MRR

Click an alert row to open the affected record, correct the data, and save it. The alert disappears once the record no longer matches the alert rule.

Circuit Detail

URL: `/circuits/{circuit_id}`

The single-circuit deep dive. Sections include:

Circuit Attributes

- Carrier circuit ID, carrier, service type, status
- Bandwidth, handoff type, purpose (backhaul, backup, DIA, customer dedicated, etc.)
- MRC, NRC, PO number, GL code

Contract & Renewal

- Contract term dates, renewal type (auto/manual/evergreen)
- Renewal notice window, decision deadline
- ETF formula and current estimated ETF value
- Price escalator details

Endpoints

- A and Z endpoint names, addresses, coordinates copied from selected infrastructure or customer sites
- Endpoint type derived from the selected site, such as tower, data center, POP, customer premise, or carrier hotel

Provider Info

- NOC phone number and escalation procedures
- Account manager contact
- Provider portal link (click to open carrier's management portal)
- Monitoring link editor for the exact LibreNMS, Grafana, or other monitoring URL
- Monitoring open button; circuits use a carrier circuit ID search link until an exact URL is saved

Documents & History

- Agreement upload/view panel
- Notes field
- Lifecycle event timeline (orders, installs, bandwidth changes, outages, renewals)

When to use: Validating a circuit before renewal, checking NOC escalation info during an outage, preparing a termination, or reviewing contract terms.

Import

URL: `/import`

Bulk-load circuits, facilities, towers, rooftops, and data centers from CSV or XLSX files.

Import Workflow

STEP	ACTION
1	Choose Circuits or Infrastructure

STEP	ACTION
2	NetOS auto-detects column mappings
3	Review the first 5 rows and mapped fields
4	Click Commit to import valid rows
5	Existing circuits are updated by carrier + carrier circuit ID; infrastructure is updated by Xiber infrastructure label
6	Missing providers and circuit endpoints are auto-created as stubs

Circuit Minimum Required Fields

- `carrier_name` — the upstream provider
- `carrier_circuit_id` — the carrier's reference number

Circuit Recommended Fields

`xiber_circuit_label`, `service_type`, `bandwidth_mbps`, `status`, `install_date`, `mrc_usd`, `nrc_usd`, `ban_id`, `billing_account`, `protocol_handoff`, `monitoring_url`, `contract_effective_date`, `contract_term_end_date`, `contract_initial_term_months`, `contract_renewal_type`, `contract_msa_terms_text`, `contract_etf_formula_text`, `a_endpoint_name`, `a_latitude`, `a_longitude`, `z_endpoint_name`, `z_latitude`, `z_longitude`

For manual UI entry, prefer selecting existing Infrastructure or Customer sites instead of retyping endpoint addresses. The endpoint import fields remain supported for bulk onboarding and legacy records.

Infrastructure Required Fields

- `display_name` — facility, tower, rooftop, data center, POP, office, or aggregation site name
- `site_type` — use infrastructure site types such as `data_center`, `tower`, `rooftop`, `colo`, `pop`, `office`, or `other`

Templates are available directly on `/import`: **Circuit CSV** and **Infrastructure CSV**.

Electrical utility services are not infrastructure assets. Add them from **Electrical** after the infrastructure or customer site exists.

See [Data & Import Guide](#) for detailed field specifications, validation rules, and API examples.

AI Assistant

NetOS includes an AI assistant drawer for users with the `ai_assistant_use` permission. The assistant is a draft helper, not an autonomous writer. Paste carrier notes, quote details, install notes, or other source text into the drawer, then prepare a draft for the active workflow.

The assistant supports draft creation for customers, infrastructure assets, RF links, and circuits. Select the draft type in the drawer, paste source material or instructions, and prepare a draft. Click **Apply to active form** to populate the

matching active add/edit form, then review and save normally. The normal API validation, RBAC checks, field-level permissions, and audit logging still apply.

Recommended intake order is customer or infrastructure first, RF links next, and circuits last. Customers and infrastructure assets become selectable sites/endpoints for RF links and circuits, so creating them first produces cleaner circuit records.

The Import page also supports AI free-form import for customers, circuits, and infrastructure. Paste multiple records into the AI import box, preferably separated by blank lines, and NetOS will create staged import rows. These rows still go through the normal import preview, validation, row selection, and commit workflow before any records are created or updated.

For customer imports, the Import page can also use the configured customer research connector. Enter a property name, address hint, website, or rough notes in **Customer site research**. NetOS calls the server-side Sonar/MCP connector, stages one customer import row, and includes research notes/citations in the preview data when available. This is an enrichment aid only; the user must review and commit the customer row before anything is saved.

The assistant also accepts PDF documents such as carrier quotes, service agreements, or order forms. Upload the PDF, add any instructions or questions, and prepare a draft. NetOS extracts selectable PDF text first and falls back to OCR when needed. The response includes page-level source snippets for extracted agreement fields and a short list of questions for missing or ambiguous values. PDF uploads are temporary for assistant drafting and do not create or attach documents to inventory records unless the user later saves through the normal forms.

Cost fields are omitted from assistant drafts when the current user cannot view circuit cost fields. The assistant reports missing required fields so the user can complete the form before saving.

When configured with an AI provider, the assistant uses durable NetOS memory entries for explicit user preferences and organization rules. Memory is stored in NetOS, not in the browser, and is only created from explicit instructions such as "remember..." or "always...". If no provider key is configured or the provider is unavailable, the assistant falls back to the deterministic parser.

Map

URL: </map>

Geographic visualization of the network portfolio.

What's shown:

- **Circuit paths** — lines from A endpoint to Z endpoint
- **RF Link paths** — wireless links from infrastructure assets to infrastructure or customer sites when both ends have coordinates
- **Endpoint markers** — dots at circuit termination points
- **Infrastructure markers** — facility icons for data centers, towers, carrier hotels, etc.
- **Customer markers** — customer sites with saved or geocoded coordinates
- **Color coding** — lines colored by carrier/provider
- **Line thickness** — scaled by bandwidth

Interactions:

- Click a circuit line → popup with circuit summary and link to detail page
- Click an endpoint → popup with connected circuits
- Click an infrastructure marker → popup with facility details

Map data refreshes automatically after circuit, infrastructure, customer, RF Link, import, or subtended network changes made in the same browser session or another open NetOS tab. The map also refreshes when the tab regains focus. Customer and infrastructure addresses are geocoded when address fields are saved without manual latitude/longitude values; RF Links to customer endpoints render once the customer site has coordinates.

If an RF Link cannot be drawn, the map displays a coordinate warning above the map. The most common reason is a customer endpoint with no latitude/longitude after geocoding. Correct the customer address fields or enter coordinates manually, save the customer, and refresh the map.

Filters:

- Link source: Circuits, RF Links, or both
- Provider/carrier
- Link type: circuit service types and RF link types
- Facility type (data center, tower, colo, etc.)
- Status (active, ordered, decommissioned)
- Location / state
- Protected or unprotected customer sites
- Minimum and maximum link length in miles

Map filters support multi-select include and exclude behavior. Open a filter, choose one or more values, switch between **Include** and **Exclude**, or use **Only** beside a value to isolate it immediately.

Dashboard

URL: /dashboard

Portfolio-level analytics and KPIs.

Dashboard data refreshes automatically after circuit, infrastructure, customer, RF Link, electrical service, or subtended network changes made in the same browser session or another open NetOS tab. It also refreshes when the tab regains focus.

KPI Cards

CARD	DESCRIPTION
Total Circuits	All circuits in the system
Active Circuits	Circuits with <code>active</code> status
Infrastructure Assets	Non-circuit facility agreements
Circuit MRC	Total monthly circuit spend

CARD	DESCRIPTION
Facility MRC	Total monthly infrastructure spend
Total Network MRC	Circuit + facility combined
Modeled MRR	Estimated monthly revenue*
Modeled Margin	Estimated margin percentage*
Renewal Window	Circuits within renewal decision window

*Modeled MRR currently uses $MRC * 1.35$ as a demonstration multiplier. Production MRR will come from Sonar revenue attribution.*

Panels

PANEL	DESCRIPTION
Spend by Provider	Bar chart of MRC by carrier
Service Mix	Circuit count by service type
Margin Distribution	Histogram of per-circuit margins
Renewal Pipeline	Circuits grouped by renewal state
Endpoint State Mix	Geographic distribution
At-Risk Circuits	Circuits with critical renewal state or low margin
At-Risk Infrastructure	Facilities approaching renewal deadline
Top 10 Expensive	Highest MRC circuits
Top Facility Costs	Highest MRC infrastructure
Lowest Margin	Circuits with worst margin performance

Timeline

URL: </timeline>

A contract-term Gantt chart for both circuits and infrastructure agreements.

What's shown:

- Horizontal bars representing contract start → end dates
- Install date markers
- Renewal decision deadline markers
- Today line (vertical red line)
- Color-coded by renewal state:
 - **Green** — stable (>180 days to deadline)
 - **Yellow** — watch (90–180 days)
 - **Orange** — active (30–90 days)

- **Red** — critical (<30 days)
- **Dark red** — overdue (past deadline)
- **Blue** — decided

Timeline rows can be grouped by vendor, type, or status. Each group header is collapsible and shows item count plus MRC rollup so large renewal timelines can be scanned by vendor exposure or asset/service type.

Filters:

- Group by: carrier, service type, or status
- Carrier
- Type
- Renewal state

Click a circuit or infrastructure row to open its detail page.

Topology

URL: `/topology`

Network relationship graph showing how sites connect through circuits and RF Links.

Visual encoding:

- **Nodes** = canonical sites (sized by connection count, colored by type)
- **Edges** = circuits (colored by carrier, weighted by bandwidth)
- **Dotted blue/teal edges** = RF Links, grouped by link type
- **Solid edges** = circuits. Circuit service or carrier differences are shown by color, not dash pattern
- **M / C markers** = MFC and commercial customer sites
- **Curved edges** = parallel circuits between the same sites
- **Dashed green node ring** = protected customer site, such as RF plus a wireline circuit, two primary ring/diverse paths, or multiple customer-serving circuits where one is Broadband, DIA, secondary, or backup
- **Infrastructure nodes** = facility assets that circuit endpoints are linked to or matched by normalized site name

Topology is site-centric. When circuit endpoints are linked to Infrastructure or Customer records, NetOS renders one node for the site and draws all related circuit edges from that node. Older imported endpoint records are also matched to infrastructure assets by normalized site name when possible, so repeated endpoint rows such as multiple BSI Huntington circuit endpoints collapse into one larger site node with multiple logical links. Customer A-side circuit endpoints are also matched to customer records by selected customer, customer name, or property name so RF and wireline paths terminate on one customer site icon. Single-ended customer backup circuits, such as Broadband or Starlink records with only an A endpoint, are attached to the customer node for redundancy detection even when no topology edge can be drawn. DIA-only MFC sites are treated as primary until an additional backup path is present. Circuits with purpose `backup` are also treated as backup serving paths for customer protection.

SPOF Detection: The side panel highlights **Single Point of Failure candidates** — sites with only one network connection and no detected redundancy. Automatic protection detection is intentionally customer-scoped: aggregation, POP, data center, tower, or rooftop sites are not considered ring-protected merely because they have one upstream path and many downstream RF/customer links. Customer sites with RF plus wireline, two primary ring/

diverse paths, or multiple customer-serving circuits where one is Broadband, DIA, secondary, or backup, are treated as protected and are not counted as SPOF candidates.

Layout modes:

- **Logical** — layered hierarchy with upstream/core sites higher and subtended aggregation/customer sites lower. Circuit A/Z direction is used as the primary hierarchy signal: A-side sites are treated as downstream and Z-side sites as upstream/donor where the circuit data follows the NetOS naming standard.
- **Geographic** — nodes positioned by approximate endpoint coordinates

Logical view uses a wide canvas and parent-grouped spreading so subtended sites stay visually under their donor structure. For example, BSI Huntington Center customer endpoints are grouped under BSI Huntington Center, while BSI US Bank Cincinnati customer endpoints are grouped under BSI US Bank Cincinnati instead of being mixed into one flat customer row. When a site has more than one upstream connection, NetOS chooses a primary visual parent for placement while still drawing the additional network links. Parents with larger downstream subtrees receive wider horizontal space, and each subtree receives a minimum lateral lane so adjacent donor groupings do not collapse into each other. Dense leaf groups wrap into multiple rows under the same parent instead of growing into one long horizontal row. If a downstream structure also has its own downstream customers, NetOS places that structure on the lower row beneath its donor before laying out its child endpoints, reducing crossed paths from intermediate aggregation sites such as Lamplighter. RF and circuit hierarchy direction is inferred from site rank and A/Z direction so core or donor sites remain above customer or subtended sites. After hierarchy placement, NetOS runs collision avoidance within each visual parent group and slightly staggers same-axis vertical chains so stacked elements do not appear to share a single straight-line path. Labels scale up modestly while zooming and use a white stroke behind the text, and parallel circuits between the same two sites are curved apart so redundant paths do not fully hide each other.

Interactions:

- Click a node → see attached circuits and RF Links
- Click an edge → see circuit or RF Link details and link to the related page

Topology filters use the same multi-select include/exclude pattern as the map. Use them to isolate or exclude link sources, providers, circuit/RF link types, statuses, facility types, protected or unprotected customer sites, and links within a minimum/maximum mile range.

Topology data refreshes automatically after network-shape changes to circuits, infrastructure assets, RF Links, customers, imports, or subtended links. Use the Refresh button when validating changes made by another user or process outside the current browser session.

Service Providers

URL: `/providers`

The carrier and provider database.

What's tracked per provider:

- Customer portal URL
- Label short name used for generated circuit labels

- NOC phone number
- Account manager (name, email, phone)
- Billing and legal contacts
- Escalation procedures
- Circuit count and total circuit spend
- Infrastructure count and total facility spend
- ETF exposure across all related contracts

Provider detail pages include tables of related circuits and related infrastructure assets.

Use **Add Service Provider** to create a provider record. Use **Edit** from a provider detail page to maintain portal URLs, label short names, NOC phone numbers, account manager contacts, legal/billing contacts, escalation paths, ASN, W-9 URL, and preferred payment method.

Infrastructure

URL: `/infrastructure`

Non-circuit network assets and facility agreements.

Asset types:

- Data centers
- Carrier hotels
- Colocation cabinets/cages
- Tower leases
- Rooftop rights
- Facility access agreements

What's tracked:

- Provider and facility name
- Monthly recurring cost (MRC) and non-recurring cost (NRC)
- Rack, cabinet, space, and power commitment details that are part of the facility agreement
- Contract term start/end dates
- Renewal notice window
- Agreement document links
- Monitoring URL for the exact facility, tower, rooftop, or data center monitoring page
- Access procedures and contact info

Electrical utility accounts are tracked separately under **Electrical** so utility service can attach to either an infrastructure site or a customer site without turning the utility account itself into a structure.

Infrastructure detail pages show an **Electrical Services** section when utility services are attached to that site. The section lists provider, service type, account number, meter number, electrical characteristics, delivery location, average monthly cost, monitoring link, and uploaded service documents.

Infrastructure detail pages also include **Site Documents** for photos, screenshots, floorplans, permits, invoices, service agreements, and other supporting documents. Image uploads capture available metadata such as

dimensions, EXIF captured date/time, GPS coordinates, camera/software hints, and file size. When the AI provider is configured, NetOS analyzes images for visible equipment, site conditions, access or safety concerns, detected text, and recommended follow-up. If AI is not configured or unavailable, the photo still uploads and metadata is retained. The document gallery can be searched by filename, title, user notes, AI summary, visible equipment, detected text, and recommended follow-up. Users can open an image and choose **Re-run AI** after updating AI settings or adding clearer notes.

The infrastructure list is grouped by BTA market state, BTA, and then city. BTA groups place smaller cities into the larger metro market they operate around, such as Columbus, Cincinnati, Dayton, Lexington, or Indianapolis. Cross-state suburbs are consolidated into the parent metro market, such as Newport, KY under OH / Cincinnati BTA. Each state, BTA, or city group can be collapsed, and group headers show asset count and monthly recurring cost rollup.

Subtended links and economics:

- Customer endpoints served by the structure
- Child facilities subtended by the structure, such as towers fed by a data center or aggregation site
- Related circuits used as transport for the subtended relationship
- Direct revenue, direct link cost, facility cost, downstream revenue, downstream cost, total margin, and margin percentage
- Effective dates for relationship changes, so historical attribution can be preserved

The Subtended Network section has three add modes:

MODE	USE WHEN
Attach existing circuit	A circuit already exists in NetOS and should be associated with the current infrastructure asset. Select the circuit; NetOS creates the relationship to this site and calculates link cost from the circuit MRC when possible.
Add customer endpoint	The site directly serves a revenue-producing customer, subscriber, building, or endpoint. Enter customer/endpoint name and revenue MRR.
Attach downstream structure	Another tower, rooftop, POP, data center, or facility rolls up to this asset. Select the downstream structure and optionally link the transport circuit.

Existing subtended network rows can be edited inline. Use the edit action to change the customer/endpoint label, downstream structure, related circuit, relationship type, transport type, direct link allocation method, inherited cost allocation method, effective dates, revenue, cost override, or notes. The list shows inherited cost attribution and the calculated inherited cost applied to each row. The inherited cost balance shows the shared monthly cost pool, assigned inherited cost, fixed/manual assigned cost, calculated assigned cost, and any unallocated balance. Manual percentage and direct inherited allocations consume the pool first; calculated methods assign only the remaining pool. If multiple fixed rows request more than the available pool, the row most recently changed keeps precedence and older fixed rows are capped to the remaining balance. If a manual adjustment leaves a balance, use Assign Remainder Pro-Rata or Assign Remainder Equally to save explicit manual percentages on the other calculated rows. The form shows calculated previews for direct link cost and a live inherited cost calculator that updates after each form change. The inherited calculator compares revenue pro-rata, equal share, manual percent, and direct/full assignment before the user saves. It uses the parent site's shared inherited cost pool, including upstream donor-chain cost after applying upstream allocation rules. For downstream structures, the calculator uses the downstream rollup revenue as the revenue basis. Parallel transport rows to the same downstream structure or customer count that revenue target once for inherited allocation. If a future direct allocation method such as bandwidth share is selected before its driver fields are available, NetOS uses the full linked source MRC rather than dropping the path cost to zero. Inherited cost allocation defaults to revenue pro-rata. Use delete only when the relationship was created

by mistake; for real historical relationship changes, prefer setting an effective end date and creating the new relationship.

For redundant downstream connectivity, add the same downstream structure more than once from the same parent, with a distinct related circuit or RF Link for each path. NetOS keeps the downstream structure's revenue and facility cost counted once while summing the cost of each active transport path. The same downstream structure still cannot be actively attributed under two different parent sites at the same time unless the existing relationship is ended.

Use the infrastructure detail page to model how revenue and expense roll through towers, rooftops, data centers, POPs, and aggregation facilities. See [Infrastructure Revenue & Expense Attribution](#) for the full attribution model, examples, and waterfall reporting approach.

Financial fields on circuit and infrastructure forms include contextual documentation links. Use those links when deciding whether a value belongs as circuit cost, direct facility cost, direct subtended-link revenue, calculated shared transport cost, or a manual override.

Infrastructure Bulk Actions

Use the checkboxes in the first column to select one or more infrastructure assets. The header checkbox selects all visible rows.

ACTION	WHAT IT DOES
Apply	Bulk-updates selected assets using only the filled fields
Delete	Soft-deletes selected assets after confirmation

Bulk update fields currently include status, provider, site type, MRC, escalator %, term end, and notes.

Electrical

URL: `/electrical-services`

Electrical services are utility cost items attached to an existing infrastructure asset or customer site. Use this section for commercial power, house power, dedicated meters, generator service, solar, battery backup, or other site electrical obligations.

Tracked fields include service provider, attached infrastructure or customer site, account number, meter number, service type, voltage, amperage, phase, delivery location, service address, average monthly cost, start date, monitoring URL, and notes.

Documents can be uploaded per service, including sample bills, invoices, service agreements, meter photos, and supporting documents. These documents help explain the recurring utility cost used in site and customer financial views.

Electrical service cost should be treated as an add-on cost to the site it serves. Do not create a separate infrastructure asset for an electrical utility account unless the physical asset is actually a facility, POP, tower, rooftop, office, or data center.

Attached electrical services appear on the related Infrastructure or Customer detail page so users can see utility services with other related circuits, RF Links, serving paths, and documents.

Financial / P&L

URL: `/financial`

The financial view provides portfolio spend and modeled P&L analysis.

Financial data refreshes automatically after circuit, infrastructure, customer, RF Link, electrical service, or subtended network changes made in the same browser session or another open NetOS tab. It also refreshes when the tab regains focus.

What's shown:

- Wholesale MRC
- Modeled MRR
- Monthly margin
- ETF exposure
- Carrier spend rollup
- Per-circuit P&L table
- Hierarchical attribution drilldown with row-level revenue and expense flow detail

In the hierarchical attribution drilldown, expand a row to see where the economics come from. Revenue items are labeled **Rolls Up** when customer or downstream structure revenue contributes upward to the serving structure. Expense items are labeled **Flows Down** when transport or path cost is assigned from a donor or parent relationship into a downstream structure or endpoint. Direct facility cost is labeled **Local** because it belongs to the structure itself.

Current limitation: Modeled MRR uses a sample `1.35x` multiplier until Sonar revenue attribution is connected.

Address Lookup

URL: `/address`

Search for circuits by address, endpoint name, city, state, carrier, or circuit ID.

What's shown:

- Matching circuit count
 - Carriers serving matched locations
 - States represented in the match set
 - Matched MRC
 - A/Z endpoint address summaries
-

Mobile / Field

URL: `/mobile`

A phone-friendly circuit lookup for field teams.

Actions:

- Search by circuit, carrier, city, or status
 - Tap **NOC** to open the phone dialer when a provider NOC number exists
 - Tap **Copy ID** to copy the carrier circuit ID
 - Tap **Map** to open directions from endpoint coordinates or address
-

Admin Queue

URL: `/admin`

The Admin page contains the user activity audit trail and the bug/feature queue.

Bug & Feature Queue

Users submit requests from the feedback form. Admins can manage each request with:

FIELD	VALUES
Priority	<code>low</code> , <code>normal</code> , <code>high</code> , <code>urgent</code>
Status	<code>new</code> , <code>triaged</code> , <code>planned</code> , <code>in_progress</code> , <code>done</code> , <code>declined</code>

Each request has a **Progress** thread. Add updates when work starts, when a fix ships, or when more information is needed. Public progress comments attempt to email the requester when SMTP is configured.

Audit Trail

The Recent Activity table shows user, role, event, entity, changed fields, IP address, and timestamp. Times are displayed in Eastern time with the timezone label. Until SSO is fully enabled, direct demo traffic falls back to `dev@xiber.com`.

Planned Views

These routes or capabilities are planned but not complete:

VIEW	PLANNED FUNCTIONALITY
Exports	Filtered CSV, XLSX, and PDF export of any view's data

Roles & Permissions

ROLE	CAN VIEW	CAN EDIT
exec	Everything	Everything
finance	Everything	Financial fields, contracts
network_eng	Everything	Technical fields, endpoints
operations	Everything	Operational fields, lifecycle events
pm	Everything	Project-related fields
sales	Everything	Sales-related fields
read_only	Everything	Nothing
agent	Filtered by MCP tool scope	Via confirmed MCP write tools

Note: The current dev build uses a header-based auth shim. Production will enforce roles via Microsoft Entra group membership.