DemandFlow Physical Planning

DEMANDFLOW®

Rooms, racks, power, cooling and cabling planned on one canvas and checked before anything is built

DATA SHEET

A data centre or exchange floor is planned in a CAD drawing, tracked in a spreadsheet, powered from a single-line diagram in a PDF and cabled from a schedule nobody updates. Each one is right the day it is drawn. The questions that matter, whether a rack can take another 4 kW, whether feed B could carry the room, where a cable actually runs, are answered by walking the floor.

DemandFlow® plans the physical estate on one canvas that reads and writes the same site, room, rack, device, port, power and cable records the rest of the platform uses. Placing a rack, racking a device, patching a port or routing a cable is checked against space, depth, weight, power, cooling and floor loading before it is saved, and nothing is written until you press Save.

What it is

A site planner for data centre, colocation and telecom operators: floor plans with racks placed on a calibrated underlay, rack elevations front and rear, a power chain from utility feed to rack PDU, cooling headroom by zone, cable trays and auto-routed cables with calculated lengths, cross-connects, fit finding and generated layouts, plan scenarios that become work orders, and the handover pack, labels, rack sheets and cable schedules the build needs.

It sits inside DemandFlow, so a planned rack appears in the capacity forecast, a routed cable becomes a connection the logical network can trace, a scenario publishes as a change with work orders, and the cost and carbon of every rack is reported beside the services it carries.

What an operator gets

- **A floor plan that refuses mistakes.** Racks drop onto a calibrated image, PDF or DXF underlay and are refused outside the room, overlapping, in a clearance or on a keep-clear feature.
- **Rack elevations with the rules built in.** Front and rear faces, U by U; a device is refused when the U is taken, the rack too shallow, the weight or power over or the space reserved.
- **Power you can fail on screen.** The chain from utility feed through ATS, UPS, PDU and RPP to each rack, with Fail feed showing what goes over rating and what goes dark.
- **Cooling and floor loading checked.** Zone headroom under N, N+1 or 2N, liquid loops for direct-liquid racks, and floor loading per rack.
- **Cables routed, measured and traced.** Trays drawn as polylines, cables auto-routed over them honouring segregation, fill and bend radius, lengths rounded to stock, and port-to-port traces through patch panels.
- **Fit and layout worked out for you.** Give it a list of equipment or a bill of materials and get ranked placements; describe a room in plain words and get up to three candidate layouts.
- **Plan, then build.** Scenarios stage every edit, publish as a change and generate work orders with kit status; strict sites change only through work orders.
- **Paper for the build.** Handover pack, rack sheets, QR and Code 128 labels, plan bill of materials and cable schedule, generated from the records.

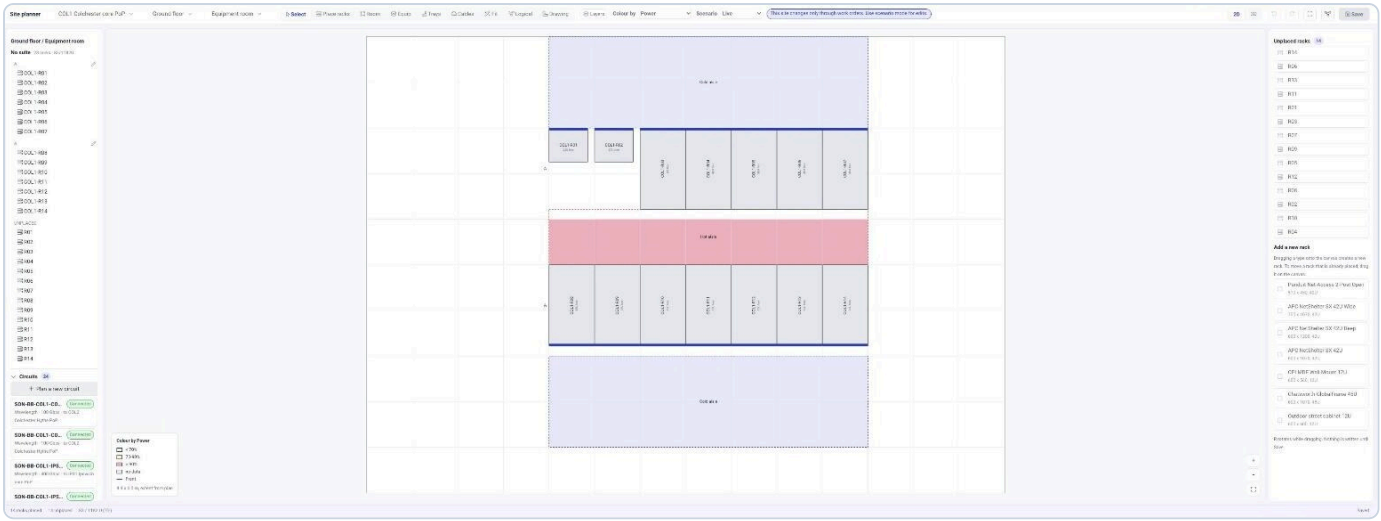

FIGURE 1. THE SITE PLANNER: FOURTEEN RACKS IN TWO ROWS WITH COLD AND HOT AISLES, THE RACK TREE AND CIRCUITS ON THE LEFT, UNPLACED RACKS AND THE RACK TYPE PALETTE ON THE RIGHT, AND THE MODE AND LAYER TOOLBAR

Rooms and racks

The planner works one room at a time with a tree and properties rail, a 2D canvas, a right-hand panel and a status bar of racks placed and unplaced, U used and planned, and unsaved edits. A floor plan image, PDF page or DXF is calibrated from two points with offset, rotation and opacity. Racks and rack types drag from the palette and snap to a 100 mm grid, rotate in 90 degree steps and are assigned to rows automatically; the defaults are 600 by 1000 mm and 42U with 1000 mm front and 600 mm rear clearance. Room mode places doors, columns, cooling units, power cabinets, risers, ramps, exit routes, no-go areas and cable entries, and draws zones; hot and cold aisles are derived from the way racks face.

Colour by U utilisation, power, weight, plan against live, row, cooling headroom, floor loading or zone, with 70 and 90 per cent bands. A 3D view of the room is one click away. Undo and redo cover every edit, and nothing reaches the database until Save.

Equip mode shows a rack's front and rear faces side by side with U numbering from the rack type, a 0U strip for PDUs and a header of used and total U, kW, kg and largest gap. Unracked assets, catalogue items and patch panels drag in, and devices move between racks; a catalogue item becomes a planned asset on Save. A drop is refused outside the rack, on a U in use, when the device is too deep, over the rack's weight or power, or in a reserved range; reservations carry who they are for and until when. Half-width and front, rear and full-depth devices are supported, a chassis shows its slot faceplate and inserting a module generates its ports.

Used U, available U, largest contiguous gap, weight and allocated power roll up from rack to room, floor, building and site, and are reconciled nightly.

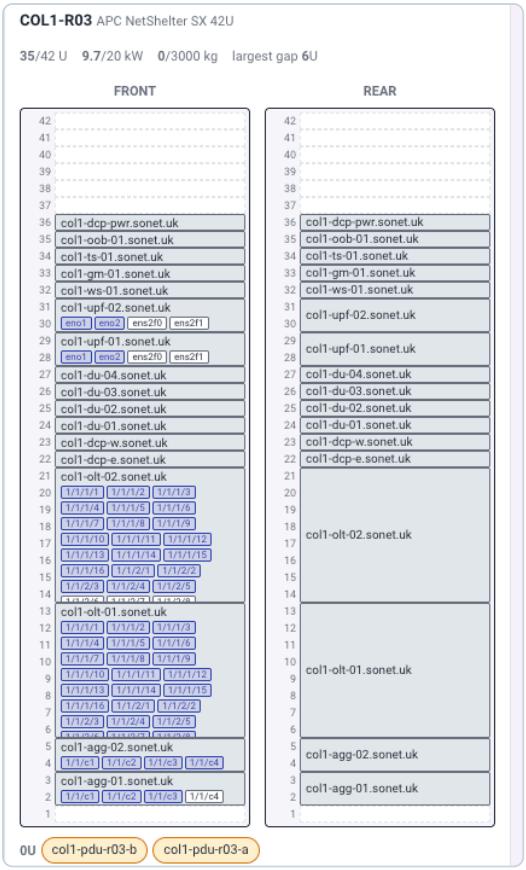

FIGURE 2. A 42U RACK IN EQUIP MODE: 35U USED, 9.7 OF 20 KW, FRONT AND REAR FACES WITH EVERY DEVICE AND ITS PORTS, AND TWO RACK PDUS IN THE 0U STRIP

Power and cooling

Infrastructure units cover the chain: utility feed, generator, ATS, distribution board, UPS, PDU, RPP, STS, CRAC, CRAH, in-row, chiller, AHU, CDU and manifold. Power circuits run from a unit to a rack PDU, whose outlets are ports and whose cords are connections, so allocated and headroom kW are computed per feed on every rack and room. Each device draws what its asset record or catalogue entry says.

The Power chain panel on a site, room, rack or unit draws the single-line diagram with headroom at every stage. Fail feed removes a feed and lists what goes over rating and what is left without power; a single-feed device check finds devices with two or more supplies that do not reach two feeds or an STS; each rack shows "If feed A fails, feed B carries N kW". Feed checks warn; rack capacity blocks.

Cooling headroom per zone is computed from the CRAC, CRAH, in-row, chiller, AHU and CDU capacity under N, N+1 or 2N redundancy. Racks are air, rear-door heat exchanger or direct liquid; direct-liquid racks need a liquid loop with headroom. A placement is refused when zone headroom would go below zero, floor loading is exceeded or a liquid rack has no loop, and warned under 10 per cent headroom.

Telemetry pollers for Power IQ, EcoStruxure IT and EkkoSense, and MQTT Sparkplug B, bring measured readings alongside the allocated figures.

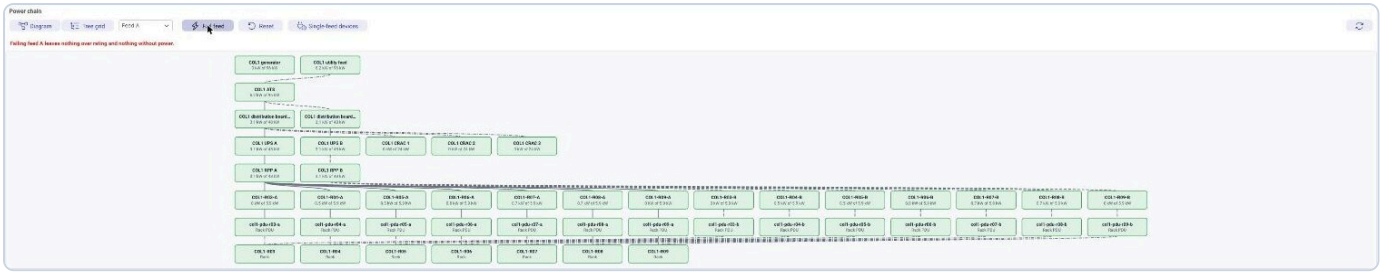

FIGURE 3. THE POWER CHAIN FOR A CORE POP: GENERATOR AND UTILITY FEED, ATS, DISTRIBUTION BOARDS, UPS A AND B, CRACS, RPPS, A AND B CIRCUITS TO EVERY RACK PDU, WITH FAIL FEED A APPLIED

Cabling and cross-connects

The Cables layer shows ports as chips; drag or click to connect across racks, with the kind inferred and a default specification. One cable per port is enforced, port state is derived, patch panels pair front and rear, and bulk patching connects range to range, each to the next free port or panel to panel. A port-to-port trace follows cables and panel pairings until it reaches an active, open or unterminated port, a fibre hand-off, a loop or a conflict, up to 64 hops, and can be saved as a path.

Trays mode draws containment as polylines that snap into bends, tees and crosses, with rack drop nodes and risers joining floors. Cables mode routes each cable over the trays honouring segregation, fill and bend radius, and calculates its length as in-rack run at 44.45 mm per U plus drop, tray run and service loop, rounded up to a stock length. Over-length and over-fill are warned and any cable can be re-routed by hand.

The site cabling page lists every connection at a site, connects in bulk, routes across rooms, accepts routes in bulk and exports a cable schedule as Excel with Schedule, By spec and Problems sheets. A patching diagram is available per room or rack, and a site connectivity view shows how the site reaches the network. Circuits can be terminated, demarcated and cross-connected in the planner, and a cross-connect board tracks each order through its work order and monthly charges.

The seeded cable specifications are Cat6 and Cat6A at 90 m, OM4 at 150 m, OS2 at 2,000 m, MPO-12, and C13/C14 and C19/C20 power cords.

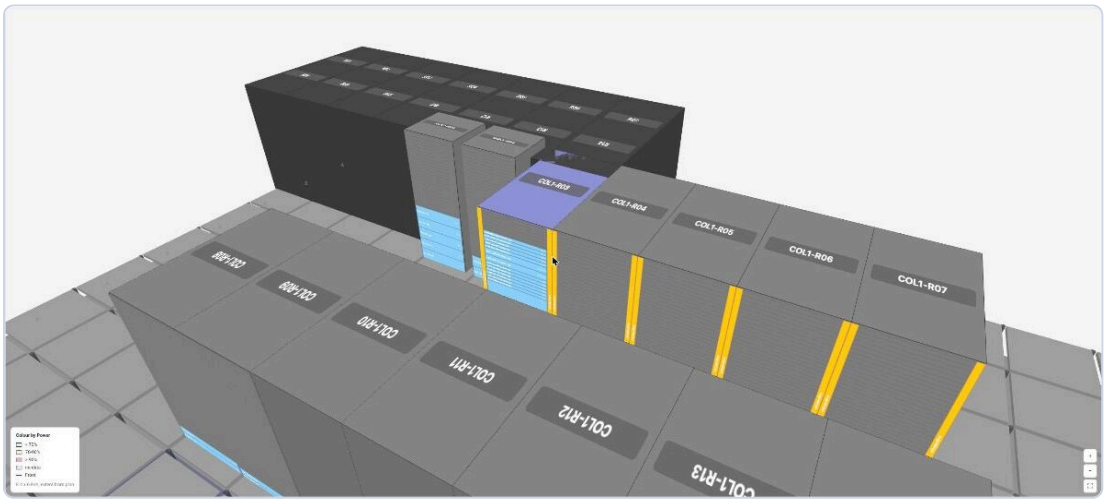

FIGURE 4. THE SAME ROOM IN 3D: THE SELECTED RACK WITH ITS DEVICES, CABLE TRAYS OVER THE ROW AND THE HOT-AISLE CONTAINMENT

Fit, layout, scenarios and reports

Fit finder. Give it a list of items or a bill of materials and a scope of rack, row or room, and choose a strategy: single rack, same row, any, fill gaps or fewest racks. It honours

Capacity. A capacity question asks whether a site can take N racks of K kW by a date outside any freeze; a per-site forecast fits twelve months of history with thresholds

U, depth, weight, power, reservations, zone cooling and free ports, ranks the proposals with a reason for every rejected rack, previews them and applies the chosen one as a plan. It can propose new rack positions when the room has none free.

Generate layout. Describe the need in plain language, "six 8 kW racks, N+1 power, hot aisle containment", and receive up to three candidate layouts, checked and ranked, to accept as a plan scenario. It is rules-based.

Scenarios and work orders. Scenario mode stages every edit as a plan line. Review the diff, see stale lines and clashes, publish on approval, and generate work orders that carry kit status (ready, partial, waiting) from stock reservations that never take stock tagged for another bill. Strict sites change only through work orders. Blast radius from a tray, PDU, rack, room, duct or cable is saved as an impact record.

and counts approved applications. Both are also MCP tools, with fit finding, for assistants and scripts.

Space and power applications. A six-step wizard with configurable approval stages and site approvers, reviews, site ratings, a pipeline and inventory coverage; placements are held as a scenario until approved, and embargoed sites must stay power neutral.

Cost, carbon and reclaim. Per-rack monthly cost, embodied carbon, operational kgCO2e from kW, hours, PUE and factor, and stranded capacity in kW, U and pounds. Safe reclaim ranks idle live devices by money and carbon, excludes DR, unknown and ownerless kit, needs a named approval and raises the work orders, disposal order and draft change.

Reports. Handover pack (contents, A3 rack sheet per rack, patch and cable schedules, tests, photos); labels as QR or Code 128 on A4 or Zebra ZPL with a scan payload that opens the record; plan bill of materials; cable schedule; rack sheet. Imports accept dcTrack headers in batches of 150 and the NetBox device type library.

Summary of specifications

Item	Detail
Canvas	2D SVG with 3D view; modes Select, Place racks, Room, Equip, Trays, Cables, Fit, Logical, Drawing; layers Drawing, Tiles, Aisles, Room, Trays, Cables, Power, Clearance, Labels, Rack data; undo and redo; nothing written until Save
Underlays	Image, PDF page or DXF; two-point calibration, offset, rotation, opacity
Racks	Default 600 x 1000 mm, 42U, 1000 mm front and 600 mm rear clearance; 100 mm snap; 90 degree rotation; rows auto-assigned; drop refused outside room, overlapping, in clearance or on keep-clear
Equip	Front and rear faces; 0U PDU strip; refusals for U in use, depth, weight, power, reservation; half-width and front, rear, full-depth; chassis slots generate ports; roll-ups rack to site reconciled nightly
Power	Units: utility feed, generator, ATS, distribution board, UPS, PDU, RPP, STS; feeds A, B, C and STS; circuits to rack PDUs; single-line diagram; Fail feed; single-feed device check; per-feed kW on rack and room
Cooling	CRAC, CRAH, in-row, chiller, AHU, CDU; N, N+1, 2N; air, rear-door HX, direct liquid with liquid loops; refuse below zero headroom, warn under 10 per cent; floor loading kg/m2
Cabling	One cable per port; patch panel pairing; bulk patching; trace to 64 hops; trays with bends, tees, crosses, risers; auto-route with segregation, fill, bend radius; length 44.45 mm/U + drop + tray + service loop to stock length; cable schedule XLSX
Fit and layout	Strategies single rack, same row, any, fill gaps, fewest racks; reasons per rejected rack; Generate layout up to 3 candidates, rules-based
Scenarios	Plan lines, diff, stale and clash checks, publish on approval; work orders with kit status; strict sites via work orders only; blast radius saved as impact

Item	Detail
Capacity	Capacity question; 12-month least-squares forecast with thresholds including approved applications; MCP capacity_query and fit_finder
Applications	Six-step wizard; configurable stages and approvers; reviews, site ratings, pipeline, inventory coverage; attachments to 10 MB
Reports and imports	Handover pack, rack sheet, labels (QR, Code 128, A4 or ZPL), plan BOM, cable schedule; physical import wizard with dcTrack mapping in batches of 150; NetBox device types; telemetry Power IQ, EcoStruxure IT, EkkoSense, MQTT Sparkplug B

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