ELEVATE
Future Faster

WHITEPAPER

Treat your Rack like Prime Real Estate

Table of Contents

Abstract

Racks are often specified late, treated as a commodity line item, and evaluated primarily on U height and footprint. That approach no longer holds. Modern data centres and enterprise compute environments place heavy structural demands on the rack, rely on predictable airflow behaviour through the rack, and concentrate increasing volumes of power, heat and fibre at the rack boundary. In practice, the rack defines the ceiling for operability: how safely equipment can be installed, how secure the rack is, how easily it can be serviced, and how reliably the environment can be kept within thermal limits.

This whitepaper reframes the rack as an infrastructure platform - a system element that directly shapes power delivery, cooling efficiency, cable management, security, and long-term maintainability. It provides guidance for consultants and specifiers on what to evaluate, what to document, and how to reduce lifecycle risk. Where helpful, examples reference the Elevate DCR rack system and its supporting containment solutions to illustrate how “infrastructure grade” rack thinking translates into real design choices.

Finally, it’s worth noting the value of out-of-the-box rack platforms where airflow, access, and cable-management features are engineered as a coherent system rather than assembled ad hoc. Where non-standard configurations are chosen, the evaluation principles in this whitepaper become even more important - because performance and operability depend heavily on integration details.

Why the Rack can no Longer be Treated as "Furniture"

Racks used to be largely passive: a frame to hold IT and networking equipment.

Today, the rack is a convergence point for multiple, interdependent constraints:

Structural

The rack must support high static loads while also accommodating real maintenance behaviour - slide rails, partial population, uneven loading and ongoing change.

Thermal

The rack influences airflow separation and leakage and can support containment approaches intended to prevent hot/cold air mixing.

Cabling

Cable volumes have increased, and routing must remain serviceable under density and change.

Security and access

Physical access control increasingly sits at rack level, with manual or electronic mechanisms available depending on security posture.

Power

Power is physically terminated, distributed and serviced at rack level. Ingress, clearance, PDU access, monitoring modules and safe routing are no longer secondary considerations - they directly affect operability and risk.

Racks are difficult and expensive to correct later. Once populated, "fixing" rack selection errors often means disruption - re-cabling, re-commissioning, change freezes, and compromised operating envelopes. Treating racks as infrastructure shifts the decision upstream - into the early design stages - where they can be aligned with equipment, power, cooling and operational requirements before constraints are locked in.

Redefining Rack Performance: From U Space to Usable Infrastructure

A rack can meet basic dimensional requirements and still fail operationally. A more useful way to evaluate racks is to separate capability into physical capacity, usable capacity, and access capacity - then validate those against the equipment profile and operational model.

Physical capacity

What the rack can hold in theory:

- Number of U
- Width
- Depth
- Nominal load rating
- Number of mounting profiles

Elevate's DCR range, offers common DC footprints (600mm/800mm widths; 1000/1200/1400mm depths; 42U/47U/52U variants).

Elevate's 800mm Wide DCR racks also offer additional U space, with 4 extra 2U 19" slots around the sides of the rack front profiles, suitable for light ancillary equipment and cable patching, increasing potential equipment space.

Elevate also offers full 200mm deep bolt on Rack Extensions, which can be useful for PDU space or in liquid cooling applications.

VIEW RACK EXTENSIONS

Usable capacity

What the rack can hold and still operate cleanly:

- **Can you access equipment and cabling without disturbing live services?**
- **Can you maintain airflow discipline and avoid bypass leakage?**
- **Can you add capacity later without turning the rear of rack into a risk zone?**

This is why rack design typically includes purposeful airflow management elements, predictable cable paths, and access features that preserve serviceability as density increases.

Elevate positions its rack and containment system around airflow optimisation, simplified cable routing and enhanced security - reflecting this usable-capacity mindset across two distinct DCR Rack models:

- **Network Racks, featuring front cable management**
- **Server Racks, with an ability to maximise available depths in the rack for the deepest server chassis on the market**

Access capacity: the hidden limiter in high-density racks

Access capacity is the practical limit defined by how easily people can:

- **Patch and re-patch at speed**
- **Service live equipment safely**
- **Replace components without disturbing adjacent services**
- **Maintain airflow elements (blanking, baffles) without removing half the rack**

This matters because the majority of day-two risk is human: rushed changes, poor visibility, restricted reach, obstructed outlets, and cables under tension are common precursors to accidental outages.

From an end-user health & safety perspective, access capacity is shaped by:

- **Clear working envelope at the rear for safe stance, reach and tool use**
- **Door design and opening behaviour (how much clearance you actually gain)**
- **Cable management that preserves access (no "patch lead wall" blocking outlets, breakers or service points)**
- **Power access without strain (no forced bends, crushed cables, or unsafe reach)**
- **Segregation and labelling discipline that reduces time spent searching in live environments**

Define access capacity expectations explicitly - not as a “nice to have,” but as a safety and reliability requirement. Document rear clearance, door swing requirements, cable pathway capacity, and access to PDUs/outlets as part of the rack specification.

A useful way to frame rack performance is as a system relationship:

- **You have the rack (structure, airflow surfaces, access, cable pathways)**
- **You have the equipment (the compute/network load)**
- **You have the power (delivery and distribution that enables operation)**

Power enables the equipment - and power becomes heat. If the rack cannot support airflow discipline and serviceable cable/power management, the environment cannot remove that heat reliably.

Racks also require space and access for high powered PDUs up to 125A with A and B supplies as standard, ensuring the rack is ready for providing the maximum power into the cabinet.

In practice:

- **No power → no performance**
- **No effective cooling → reduced equipment lifecycle and increased failure risk**

This is why “rack choice” is not separable from power density and cooling strategy. The rack is where those constraints physically converge - and where they often fail first.

Efficiency & Visibility: Rack Colour, Reflectance and Lighting Load

Rack colour has historically been treated as preference (with black a long-standing default), but it can also influence operability and energy use in environments where lighting is designed to meet specific lux levels at the working plane.

- **Darker finishes tend to absorb more light, which can drive higher lighting output to achieve the same usable visibility.**
- **Lighter finishes can improve perceived brightness and support equivalent working conditions with lower lighting intensity - a small but meaningful opportunity to reduce ongoing energy consumption (opex) at scale.**
- **Improved reflectance can also support faster visual inspection (labels, patching, port identification) and reduce avoidable human error during change.**

If you're optimising for lifecycle cost and human factors, rack colour/finish can be treated as a performance input (visibility and inspection practicality), not simply an aesthetic choice.

Select the rack for the equipment - not the grid

A common early-stage mistake is selecting a rack footprint based primarily on floor plan efficiency (grid alignment, row count, aisle width) before equipment realities are fully understood. This can produce a specification that looks tidy on a drawing but fails operationally once deployed.

Why equipment-first selection matters:

Depth is driven by hardware and cable behaviour, not just fit. Modern servers, chassis, and high-density connectivity can demand deeper frames and more rear clearance than a nominal layout assumes.

Cable and power volume scale non-linearly with density. A footprint that maximises row count may reduce rear working envelope and restrict cable pathways.

Airflow discipline depends on how the rack is built, not only on room cooling. If the rack introduces leakage paths or obstructs exhaust, the environment has to compensate - often expensively.

High Power PDU Ready. Selecting a rack design for accepting large Intelligent PDUs with quick connect PDU cable trays and large brush entry for up to 125A PDUs with optional blanking plates to maintain airflow control.

Consultants

Define rack parameters from the inside out - equipment depth, airflow behaviour, cable density, power delivery strategy and service model - then validate the floor layout. Optimising room geometry before validating the rack’s operational requirements can result in costly compromises later in the design process.

Modern data centre environments are supporting increasingly dense IT loads, with higher power servers, greater cabling volumes, advanced containment strategies and, in some cases, liquid cooling infrastructure. To accommodate these requirements, operators should ensure rack dimensions are aligned with both current and future operational needs. While 600 mm and 800 mm wide racks remain the industry standard across enterprise, colocation and hyperscale deployments, increased rack depth often provides the additional space required for larger equipment footprints, rear cable management, power distribution and effective airflow control.

Designing rack infrastructure with sufficient depth from the outset helps maximise the usable IT capacity of each footprint, supports future technology refreshes and reduces operational constraints as densities increase. By treating the rack as critical infrastructure rather than simply a floorplan element, operators can create a more adaptable white space, avoid costly retrofits and maximise long-term CAPEX returns through improved rack utilisation and greater compute capacity over the life of the facility.

Structural Readiness: Weight, Depth and Stability

When racks are treated as furniture, structural considerations are reduced to a single headline load rating. For consultants, that is necessary - but not sufficient.

Load is not just a number

A rack's load rating matters, but so does how the load is applied over time:

- **Uneven loading (heavier devices clustered at mid-height or top-heavy network racks)**
- **Dynamic servicing (pull-out rails, device removal, maintenance posture)**
- **Partial population (temporary states during refresh cycles)**
- **Ability to adjust rack feet to ensure level and constant contact with the floor**

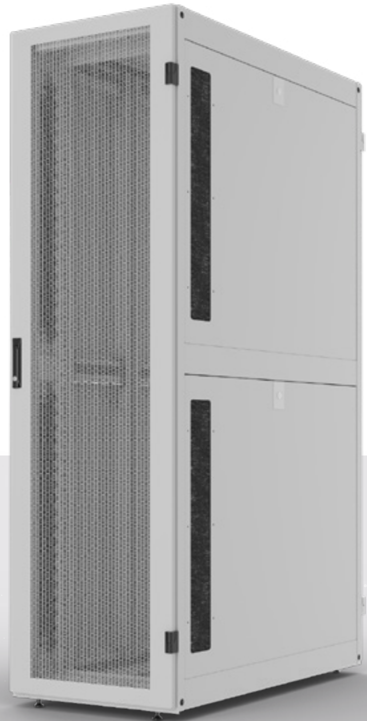
Elevate's DCR racks specify heavy duty construction with maximum load capacity stated up to 2,000kg, signalling an infrastructure grade intent for high load environments.

Depth and rail flexibility are design constraints

Depth is not simply "will it fit?".

It drives:

- **Rear clearance for airflow and cable bend management**
- **PDU placement and cable dressing**
- **Service access (especially if double rear doors are used)**



Elevate DCR offers 1000/1200/1400mm depth options and front/rear mounting profiles, which provides specifiers a practical selection set for deeper equipment and cable heavy builds.

Density drives power - and power drives cooling

As equipment density increases, the rack is no longer just carrying more weight - it is also carrying more electrical and thermal consequence. Higher device counts and higher-powered platforms drive up kW per rack, which then affects:

- **Power distribution selection (PDU type, capacity, inlet formats, monitoring requirements)**
- **Cable routing and clearance (larger conductors, more cords, stricter bend requirements)**
- **Thermal requirements (more heat to remove, higher airflow demand, increased sensitivity to leakage and bypass)**
- **Containment dependency (higher density makes airflow discipline less forgiving)**

Structural readiness and thermal readiness are linked. A rack rated for load but not designed for high-power ingress, safe servicing, and airflow control may still fail as a platform at higher densities.

The Rack as a Thermal Participant (And Why Airflow Discipline Matters)

Thermal design is not just about cooling solutions. Racks define how air moves through equipment and how effectively hot/cold streams are separated.

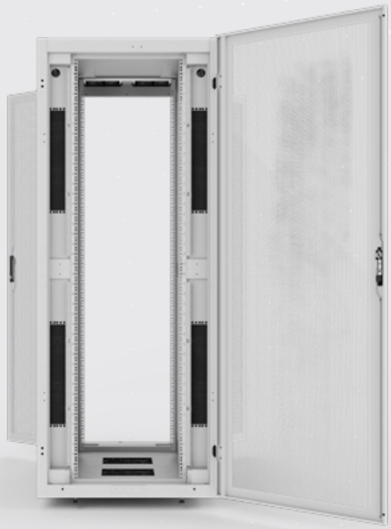
Airflow behaviour is shaped at rack level

Rack features that influence real thermal performance include:

- **Door perforation and obstruction behaviour**
- **Baffles and sealing elements that reduce bypass**
- **Roof and side openings that can become leakage paths if unmanaged**

Elevate DCR references vented front doors and double vented rear doors with up to 80% perforation, and includes airflow management baffles as standard, reflecting an approach where airflow discipline is part of the rack design rather than an optional afterthought.

As a result, independant tests demonstrate the rack design can reduce airflow loss by **up to 83%**.



Containment only works when racks are containment ready

Containment strategies depend on the rack being a compatible structural and sealing element. Elevate's rack and containment system is positioned as an integrated approach, with containment described as isolating air paths to prevent mixing and improve cooling performance.

Cable Density and Rear of Rack Reality

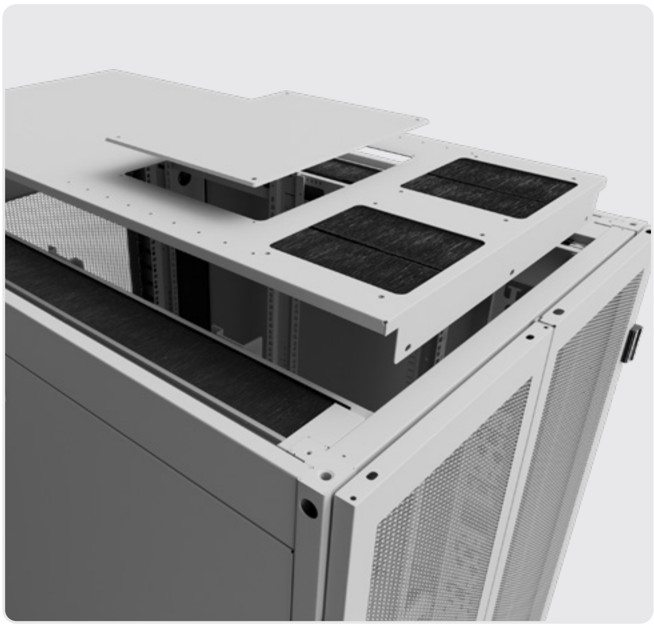
Dense racks fail quietly - usually at the rear - when cable volume, bend radius, and access collide.

Cable routing must be designed, not improvised

Specification should define expectations for:

- **Dedicated pathways (vertical/horizontal)**
- **Separation strategies (power vs data/fibre)**
- **Bend control at entry/exit points**
- **Access to PDUs and outlets without rework**

Elevate DCR references cable management features including integrated “finger style” management (on network models) and improved access points, as well as roof entry compatibility for larger PDU connection types.



Power ingress is part of the rack problem

As PDUs scale, cable ingress and plug clearance becomes a practical constraint. Elevate DCR documentation highlights roof cable access and entry/exit points compatible with EN60309 commando plug formats (including higher current options), and brush strip management at roof level.

Human Interaction: Access, Security and Safe Working

A rack is interacted with by people under time pressure. Good rack design reduces the chance of human error creating service impact.

Access is a reliability feature

Consultants should consider:

- **Door design and opening behaviour (especially rear access)**
- **Tool-less vs secured access trade-offs**
- **Removal paths for side panels and top covers**
- **Clearance for working safely in live environments**

Elevate DCR features include double rear doors and defined door locking systems (two-point front, three-point rear), supporting a balance of access and secure closure.

Door swing is part of the working envelope

Rear access is not binary (accessible / not accessible). The angle doors can open to determines how much usable working clearance a technician actually gains - especially in compact rows or where rear-of-rack activity is frequent (patching, PDU access, component replacement).

- **For standalone racks (not bayed), rear doors can open to approximately 260°, allowing doors to fold back further and maximise access space.**
- **When racks are bayed together, door opening is typically reduced - approximately 165° front and rear - which still enables access but changes how technicians position themselves and their tools.**

If rear service activity is expected to be frequent and time-critical, door opening behaviour should be treated as an access requirement - not a cosmetic detail - particularly in high-density, cable-heavy racks.

Security at rack level is now mainstream

Security increasingly needs to be granular - by row, by rack, by customer cage. Elevate's rack system references manual or electronic handle systems for access control, aligning with modern approaches where rack-level controls complement broader facility security.

Designing for Change, Not Just Deployment

Most racks look "fine" at commissioning - and become problematic after successive change cycles.

Day two reality: refresh, repurpose, densify

Over time, racks are asked to:

- **Host new hardware profiles**
- **Carry higher cable volumes**
- **Support revised power strategies**
- **Integrate with evolving containment approaches**

Racks that were only specified for day one fit can become the limiting factor that slows change, increases risk, and drives retrofits.

Choose rack variants aligned to operational intent

A pragmatic approach is to specify rack variants that match the dominant use case:

- **Server optimised builds prioritise equipment install simplicity**
- **Network optimised builds prioritise cable management capacity and access**

Elevate DCR explicitly distinguishes Server and Network configurations: server variants emphasise simplified builds without front finger management and with profiles positioned forward; network variants include finger cable management with profile positioning adjusted to support cable heavy environments.

Specification Guidance:
What to Define, Not Assume

To avoid silent failure modes, consultants should document rack requirements beyond dimensions. Key questions to define include:

- **What is the intended equipment profile now and during refresh cycles (depth, weight, airflow direction, cable count growth)?**
- **What is the expected power strategy (kW per rack, PDU topology, inlet formats, monitoring, redundancy model)?**
- **What is the operational model for access and change (frequency of patching, live work practices, rear clearance, door swing)?**
- **What airflow discipline is required (blanking, baffles, sealing, containment compatibility)?**
- **What security posture is required (manual vs electronic locks; rack-level control vs row/cage control)?**

The intent is to specify what you need the rack to enable - not simply what you need it to hold.

Where Elevate Fits

The Elevate DCR system is a useful reference example because it treats the rack as a platform rather than an empty frame.

Examples referenced in this paper include:

- **High load-rated construction signalling suitability for dense builds**
- **Defined door perforation and airflow baffles supporting airflow discipline**
- **Variant options (server vs network) aligned to operational intent**
- **Cable management and roof access designed around real ingress constraints**
- **Locking options (manual and electronic) matching modern rack-level access control expectations**
- **Integrated containment compatibility (where containment forms part of the strategy)**

These are not unique requirements - they are **illustrations** of what "infrastructure grade" thinking looks like when it is engineered into a rack platform, rather than left to site improvisation.

Conclusion

The modern rack is not furniture. It is a structural frame, an airflow control surface, a cable management system, a security boundary, and a lifecycle enabler - all at once. When racks are specified early as infrastructure platforms, consultants can protect cooling performance, reduce operational risk, and preserve maintainability through technology refresh cycles.

A robust approach is to specify for usable capacity and access capacity rather than headline dimensions: access, airflow discipline, cable pathways, security posture, power ingress, and readiness for change. Rack colour/finish can also be treated as an operational variable where opex, visibility and human factors matter at scale.

Where an out-of-the-box rack platform is selected - with airflow, access and cable-management elements designed to work together - operational outcomes are typically more predictable. Where designs are built from mixed components or heavily customised, the evaluation principles in this whitepaper become even more important, because small access or airflow compromises often become major lifecycle constraints once the racks are live and populated.

Within this context, the Elevate DCR rack system and its broader rack and containment system provide a practical reference architecture for infrastructure-grade rack thinking, emphasising airflow optimisation, cable routing clarity and scalable deployment.

Appendix: Specifier Checklist

Structural and dimensional

- [ ] Define minimum static load rating and confirm it aligns with intended equipment population (including future growth and refresh cycles).
- [ ] Define rack width/depth standards by zone (server rows, network rows, edge pods), driven by equipment depth and service envelope.
- [ ] Define rail requirements (front/rear, adjustability, service envelope, rear clearance).
- [ ] Confirm door swing requirements are compatible with row spacing and servicing model.

Airflow and thermal operability

- [ ] Specify door ventilation/perforation requirements where passive airflow is expected.
- [ ] Specify airflow management expectations (baffles/seals/blanking) to control bypass leakage.
- [ ] Ensure rack choice is compatible with containment strategy (if used).
- [ ] Confirm the rack platform supports airflow discipline throughout day-two changes (not only at commissioning).

Cabling and power ingress

- [ ] Define internal cable pathway requirements (vertical/horizontal) and separation principles (power vs data/fibre).
- [ ] Define roof/side entry expectations for power and data and confirm clearance for real plug formats and bend radius.
- [ ] Specify rear-of-rack working clearance requirements to preserve serviceability under density.
- [ ] Define “access capacity” expectations: ability to patch, service, and reach PDUs safely without disturbing live services.

Access and security

- [ ] Define locking model (front/rear) and whether electronic access control is required.
- [ ] Confirm access design supports safe working practices during live maintenance (including door opening behaviour and rear envelope).
- [ ] Confirm visibility requirements (labels, patching, inspection): consider rack finish/colour as part of human-factors design where relevant.

Lifecycle and change

- [ ] Document the intended change model (refresh cadence, repurposing, growth).
- [ ] Specify rack variants aligned to dominant use case (server optimised vs network cable optimised).
- [ ] If using non-standard or mixed-component rack builds, treat rack selection as a risk control exercise - and document integration assumptions explicitly.

Key Resources

Elevate Website

DCR Configurator

Brochures

Datasheets

Elevate Whitepaper – The Five Levers of Optimisation rev 1.0 - 08/07/26

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