

Data Centre Layout Plans

Facility-Level Zoning, Adjacency, and Flow Design

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Data Centre Layout Plans

What Layout Planning Actually Covers

Layout planning operates one level above the floor plan (see our dedicated Floor Plans guide) — it is the facility-wide zoning exercise that determines where white space, gray space, loading, offices, and security zones sit relative to each other, and how power, cooling, and network infrastructure physically reach the data hall. Get this wrong and no amount of good floor-plan design inside the data hall can fix it.

Core Zones in Any Data Centre Layout

- **White space (data hall).** The IT rack area — the revenue-generating space, and the zone every other decision should optimise around.
- **Gray space (mechanical/electrical plant).** UPS rooms, switchgear rooms, battery rooms, chiller plant, generator yard. Typically 40–60% of total built-up area in a Tier III+ facility.
- **Loading and staging.** Dock area for equipment delivery, unpacking, and staging before installation — frequently under-sized in first-time builds, causing installation bottlenecks.
- **Network/telecom entry.** Meet-me room (MMR) location relative to the data hall determines structured cabling run lengths and, at scale, latency.
- **Office, NOC, and security.** Operations centre, security screening, and administrative space — physically separated from white space per most Tier III/IV design standards.

Adjacency Principles

1. **Electrical plant adjacent to the data hall it serves**, minimising cable run length and voltage drop between UPS output and rack PDU input.
2. **Cooling plant positioned for shortest chilled-water or refrigerant run** to the data hall's air handling units, while keeping generator/chiller noise and vibration away from sensitive areas.
3. **Loading dock positioned for a direct, obstruction-free path to the data hall** — every 90° turn and doorway a fully-loaded rack must pass through adds installation time and risk.
4. **MMR positioned close to the data hall's network zone**, with diverse physical routing to the building's external fiber entry points (see our Space Utilisation guide for how this affects row layout).
5. **Security perimeter wraps the white space and gray space**, with office/visitor areas outside that perimeter — a standard Tier III/IV requirement most auditors check first.

Layout Patterns by Facility Format

Format	Typical Layout Pattern	Key Consideration
Small/Edge (1–5 racks to ~1 MW)	Single data hall, plant on one side or rooftop	Minimise footprint; often a converted or modular building
Small/Mid (6–20 racks to ~5 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Mid (21–50 racks to ~10 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Large (51–100 racks to ~20 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Large (101–200 racks to ~40 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Large (201–500 racks to ~100 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Large (501–1000 racks to ~200 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building
Large (1000+ racks to ~400 MW)	Single data hall, plant on one side or rooftop	Efficient use of space; often a converted or modular building

Medium (1–10 MW, enterprise/colo)	Multiple data halls, shared central plant	Balance plant efficiency with per-hall redundancy isolation
Large/Hyperscale (10 MW+)	Modular hall-by-hall build-out, dedicated plant per hall or hall cluster	Layout must support phased construction without disrupting live halls

Growth and Phasing in Layout Design

The single most common layout mistake we see: designing Phase 1 without reserving the physical envelope for Phase 2 and 3. A layout plan done properly reserves:

- Land/floor area for future data halls in the exact geometry the expansion will need (not “somewhere on the remaining site”).
- Electrical room capacity (switchgear bus bar spare ways, transformer pad space) for the ultimate build-out, even if only Phase 1 equipment is installed initially.
- Cooling plant space and pipe/duct routing sized for ultimate capacity, so Phase 2 cooling doesn't require re-routing Phase 1 infrastructure.

Layout Plan Checklist

- ☐ White space and gray space ratio validated against target Tier level
- ☐ Loading dock has a direct, obstruction-minimal path to the data hall
- ☐ MMR located for shortest, most diverse fiber entry routing
- ☐ Electrical and mechanical plant positioned for shortest run to their respective data halls
- ☐ Security perimeter correctly wraps white space and gray space
- ☐ Physical envelope reserved for Phase 2/3 expansion in the correct final geometry
- ☐ Rack row orientation within each hall planned against structured cabling and containment plans (see Floor Plans guide)

How Athena Rack Supports Layout Planning

Our rack and containment systems are designed to standard footprint dimensions that map cleanly onto common layout grid modules (600mm and 1200mm planning grids), so your layout plan and your final rack floor plan stay in sync from the first design sketch through to installation — no re-work when Phase 1 racks are ordered against a Phase 2 layout.

Related Resources

- The Data Centre Build Guide — where layout planning fits in the overall build sequence
- Data Hall Floor Plans — row-level layout inside the white space
- Space Utilisation & Capacity Planning — density and growth modelling
- Rack Design & Selection Guide