

N+1 ADVISORY

Systems Engineering Consulting for Mission-Critical Infrastructure

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N+1 helps owners, developers and operators of mission-critical facilities and AI infrastructure connect workload requirements, equipment choices and facility constraints to make informed technical and commercial decisions. We facilitate, coordinate or execute services directly or through established channels.

We review and recommend. You decide.

Services span site selection, design, procurement, construction, deployment, commissioning and operations.

1. COMPUTE, NETWORK, STORAGE AND PLATFORM

- Data center, enterprise, AI cluster and HPC architecture: vendor reference-architecture fit, server and rack configuration, and rack density against power and space.
- Platform selection across x86 and ARM CPUs, GPUs, DPUs, FPGAs and ASIC-based accelerators: workload fit, memory, I/O, interconnect, software and licensing.
- Ethernet, InfiniBand and Fibre Channel networking: topology, port counts, optics and cabling against capacity, resilience and support requirements.
- File, block, object and parallel storage: capacity, performance, data protection, backup and disaster recovery.
- Software and platform dependencies: virtualization, containers and orchestration, cloud and as-a-service models, licensing and security requirements.
- IT cybersecurity: security requirements and incident response planning across compute, network and storage systems.

2. SITE, UTILITIES AND DEVELOPMENT

- Site selection and technical diligence: power availability, utility studies, interconnection, carrier access, land, zoning and development considerations; greenfield, retrofit, modular and edge options.
- Zoning, entitlement and permitting: technical requirements, approval dependencies, schedule considerations and coordination through the approval process.
- Community and stakeholder engagement: local outreach, public-input coordination and schedule alignment during site selection and design.
- External connectivity: carrier access, fiber routes, entrance infrastructure, service requirements and resilience planning.
- Water supply, storage and treatment: availability, supply constraints, capacity and quality against cooling and process requirements.
- Wastewater, discharge and stormwater: discharge requirements, treatment interfaces and drainage risks to critical systems.
- Structural, civil and geotechnical: foundation, loading, vibration and ground conditions against facility and equipment requirements.
- Environmental hazard review: flood, heat, wind, wildfire and seismic exposure against site and facility requirements.
- Environmental impact and resource efficiency review: noise, emissions, energy and water requirements against facility constraints.

3. ELECTRICAL INFRASTRUCTURE (GRID TO RACK)

- Utility interconnection, substations and high-voltage transmission up to 500 kV: planning, design, engineering, installation and coordination.
- Medium- and low-voltage distribution: transformers, switchgear, generators and transfer switches, UPS and batteries, distribution boards, busway and rack power; protection, selectivity and redundancy against actual loads.
- Arc-flash, coordination and grounding studies; power quality; bridge generation and energy storage.
- NETA acceptance and maintenance testing programs; findings review, corrective actions, outage and cutover planning.
- Fuel system and supply: storage capacity, supply arrangements and replenishment requirements for backup generation.

4. COOLING AND FACILITY DESIGN

- Air and direct-to-chip liquid cooling options against rack density, operating needs and facility constraints; chilled-water, fan-wall and coolant distribution interfaces.
- MEP design and engineering: rack and white-space planning; mechanical, electrical and IT interface and constructability review.
- Fire and life safety: detection, suppression, evacuation and emergency access requirements within facility design.
- Functional and process safety: safe-shutdown design for hazardous processes during equipment or controls failures.
- Process utility and controlled environment: utility requirements, contamination control and facility interfaces.

5. CONTROLS, SECURITY AND COMMISSIONING

- Controls, monitoring and alarm systems: building management, electrical power monitoring and SCADA requirements, interfaces and alarm coordination.
 - Monitoring and controls interfaces: building management, electrical power monitoring and SCADA systems.
- Voice, radio and emergency communications: paging, two-way radio and mass notification system design and coordination against operating requirements.
- Physical security: perimeter protection, access control and surveillance design against site and operating requirements.
- Operational technology security: control system access, network separation and monitoring requirements across facility systems.
- Commissioning readiness, acceptance criteria and integrated systems test planning; SOP, MOP and EOP review.

6. PROCUREMENT AND VENDOR MANAGEMENT

- OEM, integrator and bid review: scope, compatibility, price, lead time, warranty and support; RFP and RFQ support.
- Substitution and design-change review: quantity, cabling, power, cooling, warranty and schedule consequences; pricing benchmarks.
- Equipment sourcing through established channels, including long-lead power and mechanical packages.
- Vendor and supplier management: selection, contracts, delivery schedules, warranty and support performance.
- Total cost of ownership, refresh and phased-expansion economics.
- Project scope, cost and schedule: technical dependencies, responsibilities and coordination across equipment and construction packages.
- Contract interface: supply, acceptance, warranty and support responsibilities across equipment and service packages.

7. DEPLOYMENT AND INTEGRATION

- Deployment and integration of new compute, network, storage and electrical systems into new or existing facilities and systems.
- Readiness across power, cooling, space, cabling, existing IT and monitoring connections.
- Cutover, migration and handoff planning around production, uptime, safety and change-control requirements.
- Construction logistics: delivery access, staging and temporary utility requirements for installation and cutover coordination.
- Responsibility and interface planning: who supplies, installs, tests, operates and accepts each package.

8. OPERATIONS, RELIABILITY AND EXPANSION

- Operating procedures, staffing, spares and support review before handoff; ongoing operations.
- Resilience requirements: availability targets, acceptable failure conditions, redundancy and maintainability planning.
- Failure investigation and root-cause review; single points of failure and maintainability against availability requirements; maintenance, corrective-action and capital priorities.
- Vendor and service-contract management in operation; outage and emergency-response planning with operating teams.
- Refresh and phased expansion against capacity and reliability needs.
- Maintenance and asset management: maintenance plans, asset records and scheduled tasks against operating requirements.
- Facility continuity and recovery planning: dependencies across operating teams, facilities, communications and IT systems.
- System records and configuration: record accuracy, configuration changes and handover information supporting safe operation.
- Decommissioning and equipment recovery planning: isolation, data handling, equipment removal and site disposition.

HOW WE ENGAGE: Engagements range from focused project reviews to ongoing advisory and owner's-side technical support, or a combination. Tell us what you are building and where it is stuck, and we can discuss what fits.

Representative sectors: Neo-cloud and AI infrastructure; data centers and colocation; financial services and quantitative computing; research and public sector; healthcare; media and gaming; semiconductor and advanced manufacturing; logistics, telecom, utilities and mining.

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SERVICE COVERAGE

Compute and platform. Workload and reference-architecture review across data center, enterprise, AI cluster and HPC systems; x86 and ARM CPUs, GPUs, DPUs, FPGAs and ASIC-based accelerators; memory, I/O, interconnect, server configuration and rack density.

Networking. Ethernet, InfiniBand and Fibre Channel architecture; leaf-spine, rail and top-of-rack layouts; core, edge, management and out-of-band networks; topology, port counts, optics, structured cabling, resilience and support requirements.

Storage and data protection. Requirements and architecture across file, block, object and parallel storage; capacity, performance, flash and disk options, backup, disaster recovery, replication and data movement.

Software and platform dependencies. Virtualization, containers, orchestration, cloud and as-a-service options; software compatibility, licensing and security requirements within the system architecture.

Site selection and utilities. Technical diligence on power availability, utility studies, interconnection and queue strategy, capacity phasing; carrier access, land, zoning and development considerations; greenfield, retrofit, modular and edge options. Also Zoning, entitlement and permitting; community and stakeholder engagement; external connectivity; water supply, storage and treatment; wastewater, discharge and stormwater; structural, civil and geotechnical; environmental hazard review; environmental impact and resource efficiency review.

Electrical infrastructure, grid to rack. Transmission up to 500 kV, substations, and medium- and low-voltage distribution; transformers, switchgear, generators, transfer switches, UPS and battery systems, distribution boards, busway and rack power; load, protection, selectivity and redundancy review; arc-flash, coordination and grounding studies; power quality; bridge generation and energy storage; NETA acceptance and maintenance testing programs with findings and corrective-action review; transmission-line design, engineering and installation. Also Fuel system and supply.

Cooling and mechanical interfaces. Air and direct-to-chip liquid cooling options against rack density, operating needs and facility constraints; chilled-water, fan-wall and coolant distribution interfaces; airflow and containment.

Facility design and commissioning. MEP design and engineering; rack and white-space planning; MEP and IT interface and constructability review; commissioning readiness, acceptance criteria and integrated systems test planning; SOP, MOP and EOP review; BMS, EPMS and SCADA interfaces. Also Voice, radio and emergency communications; physical security; operational technology security; controls, monitoring and alarm systems; fire and life safety; functional and process safety; process utility and controlled environment.

Procurement and vendor management. Equipment and scope comparisons; RFP and RFQ support; pricing, lead-time, warranty and support review; substitution and design-change impacts; total cost of ownership; sourcing for compute, network, storage, power and mechanical equipment through established channels; vendor and supplier management through selection, delivery and support. Also Construction logistics; project scope, cost and schedule; contract interface.

Deployment and integration. Integration of new systems into new or existing facilities; readiness across power, cooling, space, cabling and monitoring; cutover, migration and handoff planning; construction coordination with project contractors.

Operations, reliability and expansion. Procedure, staffing, spares and support review; failure investigation and root-cause review; single points of failure and maintainability against availability requirements; maintenance and capital priorities; vendor and service-contract management; outage and emergency-response planning with operating teams; refresh, capacity phasing and lifecycle costs; ongoing operations. Also IT cybersecurity; maintenance and asset management; facility continuity and recovery planning; resilience requirements; system records and configuration; decommissioning and equipment recovery planning.