FLYING SOLO, OR GOING COLO?

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EXECUTIVE SUMMARY

Building and operating an enterprise data center ("flying solo") can be a daunting task that is capital intensive. Being a tenant at a colocation provider can take a lot of burden off the corporate facilities team and reduce CAPEX, yet leave the IT side of the house bearing the brunt of the responsibility for maintaining uptime of critical infrastructure while concurrently minimizing OPEX.

Incorporating intelligent racks, including power distribution units, environmental sensors, door access controls, asset monitoring, serial consoles and KVM in the IT equipment racks housed at remote colocation facilities is a low cost means of ensuring the IT equipment is using all the power being paid for, that hardware is operating in a safe environment, and that physical security is always maintained, thereby maximizing uptime and return on investment.

INTRODUCTION

Modern data centers are some of the most complex buildings around, getting more complex by the day. Costs for building a state of the art hyperscale data center can quickly run into the range of billions of dollars before the first bitcoin is mined or the first video is stored. A company that chooses to build its own data center must have the strategy, the vision, and the fortitude to see construction through to completion of the building and commissioning of the systems before the first dollar of return on investment (ROI) is ever seen. Despite the difficulties both real and perceived, there are still many companies choosing to build their own infrastructure to support their IT needs. In this paper, these companies are referred to as "flying solo."

Flying solo is the way to go when IT is a profit center rather than a cost center for the company. A well-designed IT environment with the right "user experience" can be a lucrative means of differentiating one company from another. The Amazon.com website is a great example of this. Building a data center also allows greater flexibility in ways of controlling expenses versus occupying colocation facilities or using public cloud infrastructure. Flying solo can also be a requirement of the business when growth necessitates moving applications out of the cloud or out of a colocation facility.

On the other hand, choosing to place your data center assets at a colocation ("colo") facility can be a logical step for many IT-centric businesses. Whether driven by growth, consolidation, latency, or time to market, moving IT infrastructure into a colocation facility can be a smart choice for IT-reliant companies. By reducing capital expenditures (CAPEX) and not building their own data center, money is freed up to focus on other core aspects of growing and running the business. In most instances, the colo is already outfitted with a highly efficient

Top 5 Markets for Colocation

1. London, GB
2. Frankfurt, DE
3. Amsterdam, NL
4. Washington D.C., US
5. Hong Kong, CN

infrastructure, more interconnect, more bandwidth, and more redundancy than most companies are willing to acquire for their own dedicated data centers. The expertise of the colocation providers shows in how they have replicated their facilities from location to location. Sounds like a great deal, right?

Colocation providers offer many services along with the "white space" they sell. For example, they charge for power. They charge for the infrastructure changes needed to support cooling of loads exceeding 5-10 kW per cabinet. And they charge for monitoring services, remote hands support, equipment cleaning, and so on. They may even charge extra for detailed billing versus single line item bills. Want full power path redundancy for your application? That's two RPPs, two drops to the rack. Two UPS systems. Two generators. Costs can quickly escalate.

However, there always comes a time where the prudent colocation customer chooses the "belt and suspenders, trust but verify" approach to operating their remote IT assets. They choose to measure their actual power usage themselves, implement a secondary set of environmental monitoring, and even implement secure access to their individual racks within the pod, room, or cage of the colocation provider. An SLA from the colocation provider only goes so far when the data center goes down and other larger tenants get priority over you and your needs. Taking responsibility for uptime by implementing trend alarms on power usage and operating temperature can prevent a lot of heartache and grief from upper management and shareholders. Remote rack access controls can ensure that remote hands technicians of the colo provider access only the intended rack. Asset management tracking can take that another step and ensure only the individual piece of hardware within the rack is removed, repaired, or replaced.

FLYING SOLO.
NOW WHAT?

Building a data center requires a solid team of professionals working together to balance the needs of the business with the needs of the anticipated users of the data center. Knowing IT systems and software is not enough to enable a data center to be successfully designed and built. People skilled in the areas of real estate, finance, utilities, contracting, procurement, project management, personnel management, and building management are required to minimize expenses while maximizing ROI.

Allow these people the time to ask the detailed, difficult questions that are crucial to meeting the expectations of company management that are driving the decision to build a company-owned and operated data center. Documenting the answers and reviewing them with senior management ensures that everyone understands the objectives for building the data center and the criteria for measuring success.

No data center can operate without power. The choice of power architecture and delivery, to the data center, to the rack, and within the rack itself, can determine whether your data center is able to meet its targeted operating metrics. The rack PDU chosen can be instrumental in enabling power measurement and management in a heterogeneous environment where there is a broad mix of suppliers for servers, storage, and connectivity.

Successfully building a data center also depends greatly on the suppliers and partners chosen to help in the design, construction and commissioning processes. Finding innovative companies that can provide a broad line of data center specific products in the volumes and feature sets needed to support the goals for the data center built to "fly solo" increases the chances for a positive outcome when assessing if the data center is meeting its targeted metrics.

CONSIDERATIONS FOR FLYING SOLO

The complexities of today's data centers present a formidable obstacle to many companies. Below are but a few of the numerous choices and goals to be made when building out a company-owned enterprise data center:

☐ What is the nature of the computational load in the data center? Does it require a particular amount of uptime (99.999%), or Tier Rating (as defined by The Uptime Institute)?

☐ Is the data center expected to achieve a certain efficiency (PUE) or carbon footprint?

☐ How much power and cooling per square area will be required?

☐ Will the data center use renewable energy generated on site, or will it rely on public utilities?

☐ How is floorspace to be allocated between actual compute infrastructure and all the other support around it (offices, cooling, etc.)?

☐ What degree of physical and logical access control will need to be initially implemented, and what systems will have to be maintained over time?

☐ Will the data center require 24-hour onsite personnel support?

☐ What are the goals for latency /responsiveness from the data center?

☐ Will the data center need to have a secondary disaster-recovery facility built to run in parallel?

☐ How quickly does the business need to have systems up and running?

☐ Will the data center support development activities as well as production?

☐ What is the supply base ecosystem that you will need? Open Compute vs. Open19 vs. OEM vs. ODM?

☐ How long do we expect the data center to be in operation before a refresh cycle occurs?

☐ How frequently will the users need to physically access or update equipment?
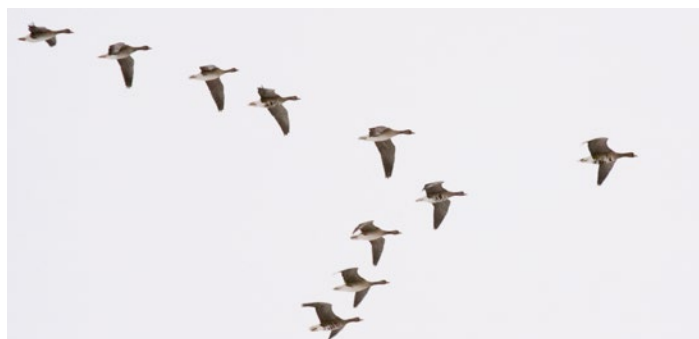
GOING COLO.
NOW WHAT?

Here comes the fun part. The decision to deploy at a colo has been made. Next decisions center around whether you will be taking gear out of your existing data center and relocating it, or whether you will be deploying all new IT hardware to the colo facility.

Redeploying

In theory, re-deploying your existing assets should be a low-risk path to success. You know things already work together, and everything is already in a rack, so how hard could it be? Hire a relocation or migration service and away you go. But there are risks to consider with this. Hardware could get damaged in transit. Or stolen. Power drops at the new facility may not be compatible with every cabinet. Schedules could get delayed. Your gear may be too heavy as racked to roll across the tile floor of the colo. Or too tall to fit through the doors of the white space. Or drives that had been spinning for years refuse to re-start once powered again at the colo.

Buying New

Depending on your perspective, deploying new assets to the colo means you can start fresh, with new products and new architectures suited to the changing needs of your business, hardware that is likely to be more efficient and more reliable than the aged gear you already own. But for some people, choosing to go with new hardware is a headache. To minimize that pain, look for best of breed suppliers that can help you pull together a range of products and services into a "guaranteed to work together" solution, one that supports your business today and tomorrow. Look for suppliers with a broad offering, and that have an extensive network of resellers, integrators, and partners to support your infrastructure no matter where on the globe it will be located.

CONSIDERATIONS FOR GOING COLO

Before making the jump into a colocation deployment, there are numerous considerations that should be factored into the decision process:

☐ Can the colo handle your rack power density today with a single power drop to the rack? What about for future needs?

☐ Can the colo provide adequate cooling for the targeted rack power density and temp specs, today and for the foreseeable future?

☐ Will you rely on remote hands service of the colo provider, or some third party, to re-boot locked-up hardware?

☐ Is the IT load time-sensitive, or highly impactful of revenues?

☐ Will the racks in the colo require frequent access, whether for changing IT configurations or repair purposes? If yes, by whom? Would it make sense to have an asset management system in place at the rack level?

☐ Does the IT hardware support IPMI, or does it require other out-of-band (OOB) access? How to achieve multiple paths to the control interfaces of remote hardware?

☐ Does the colo provider offer DCIM as-a-service? If not, would it be helpful to deploy your own DCIM?

☐ What considerations need to be given to security of the IT assets, both physical and logical?

There are *many* checklists available to those considering going to a colocation facility for their data center needs. Those found in the Appendix should be helpful as a starting point for most circumstances. The colocation providers shown in the illustration of the Introduction section of this paper can help the potential customer make an informed decision about what to consider in choosing a colo provider, and what steps to take to have a successful deployment to a colocation facility.

INTELLIGENT RACKS — YOUR BEST CHOICE
WHEN "FLYING SOLO" OR "GOING COLO"

Believe it or not, power should be one of the first considerations when buying new gear for a colocation deployment. Power is one of the highest recurring costs when operating in a colocation facility. A power distribution unit (PDU) is the foundational hub for building out an intelligent rack. A well-chosen PDU can help minimize the number of power drops from the colocation provider to the IT infrastructure and gives that "belt and suspenders" reassurance that you are receiving and making efficient use of all the power you pay for each month.

In choosing power, it is critical to have the right form factor, outlet count, and feature set for your application. It is also important to consider whether you need 1kW, or over 100kW in a PDU, AC or DC power.


PDUS

Choosing a PDU suited to the chosen colocation environment is crucial to achieving operational uptime and efficiency goals. With remote outlet power measurement and control, intelligent PDUs offer the convenience of remote reboot via an embedded web interface or through SNMP, helping avoid a "remote-hands" call.

- ☐ Validate power consumption and/or power reporting
- ☐ Monitor rack level infeed power
- ☐ Monitor outlet power
- ☐ Control rack access
- ☐ Monitor rack access via IP camera
- ☐ Asset tracking
- ☐ Environmental monitoring — temperature, humidity, air pressure differential, floor level water detector
- ☐ Dry contact closure sensing
- ☐ Remote power management and/or device reboot
- ☐ Smart load shedding
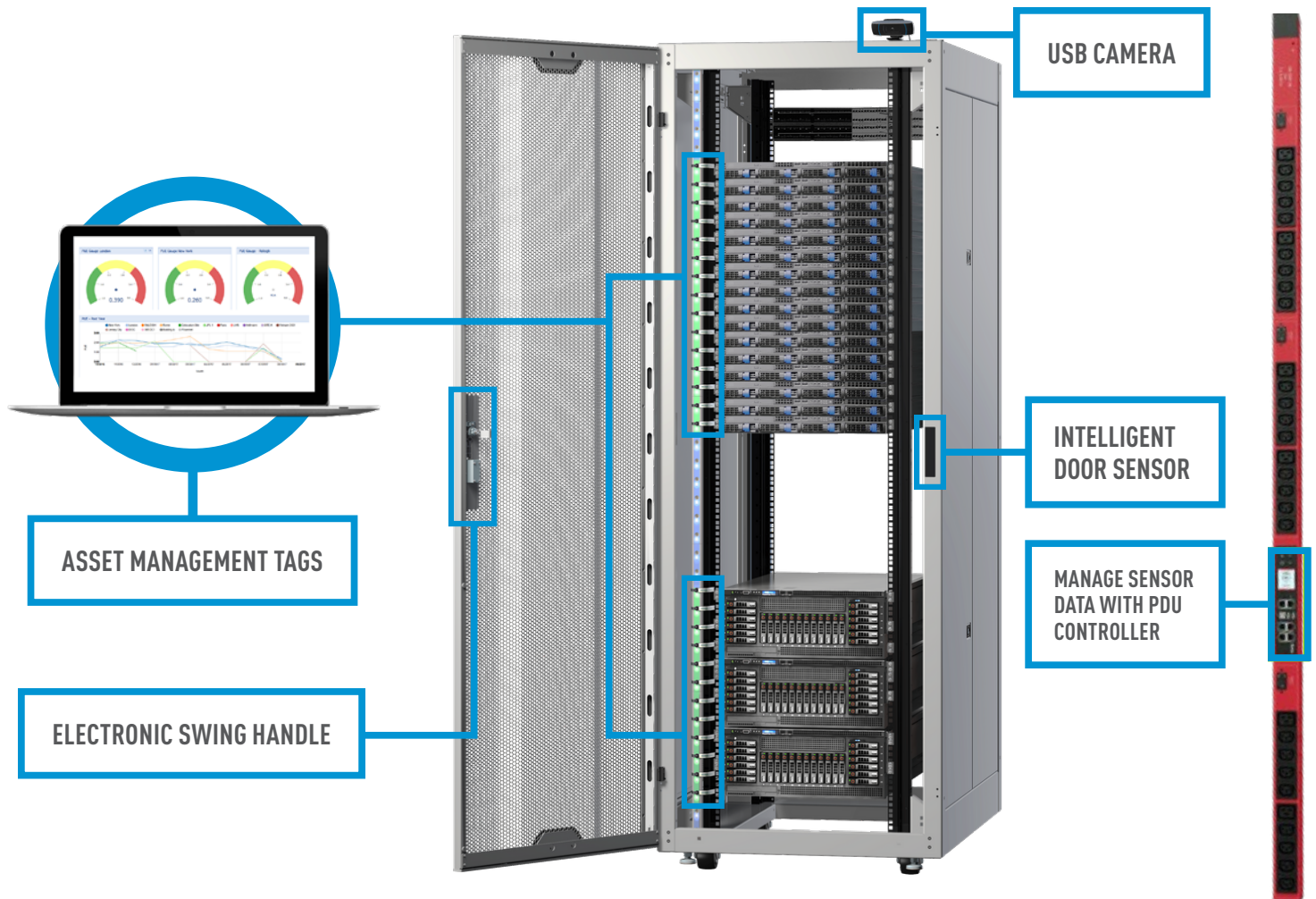- ☐ Capacity planning

ENVIRONMENTAL SENSORS AND MONITORING

TEMPERATURE

RACK INLET TEMPERATURE AND HUMIDITY

VIBRATION

AIRFLOW

DIFFERENTIAL AIR PRESSURE

CONTACT CLOSURE

WATER/LEAK
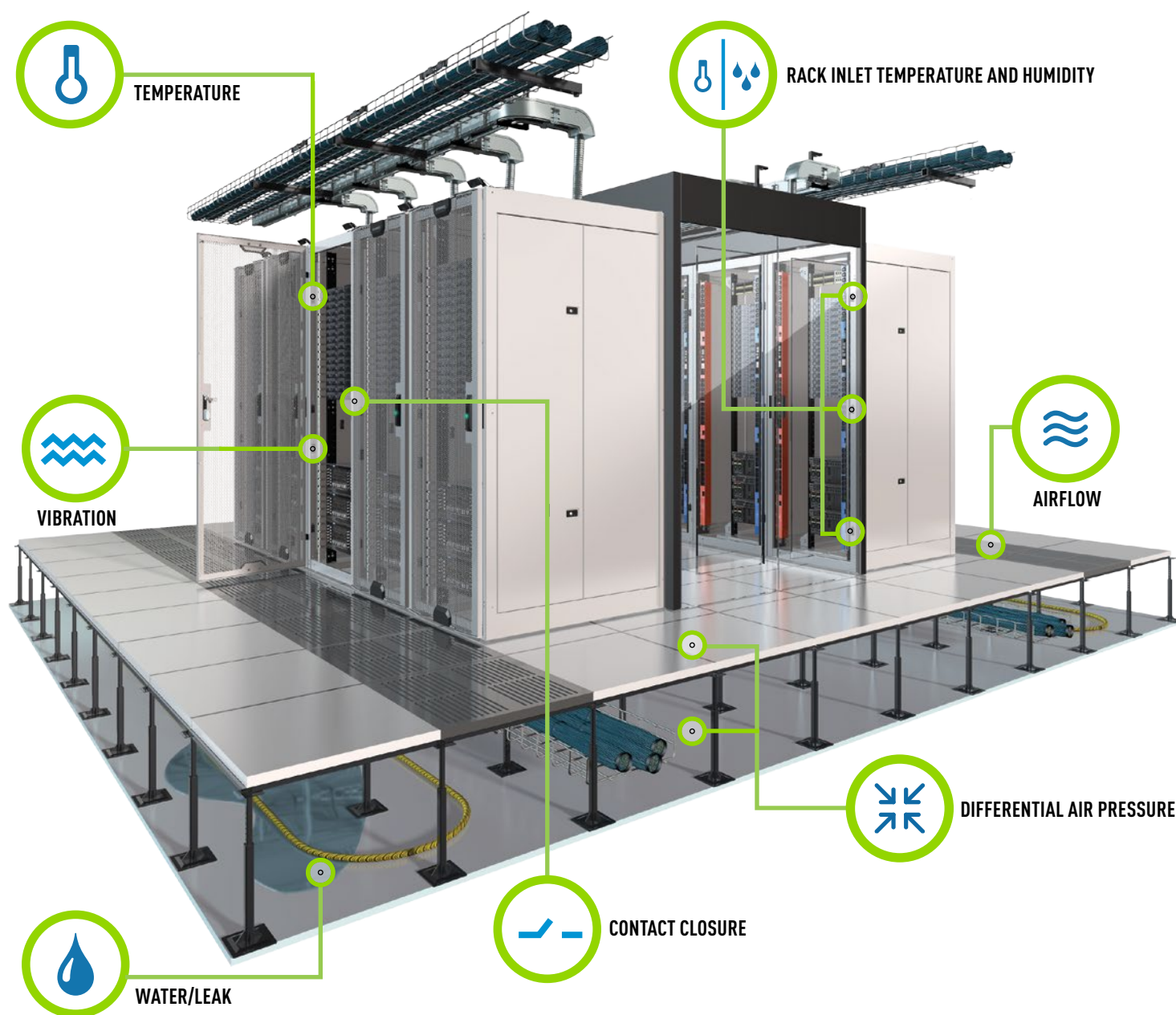
Whether IT gear is located on-premises ("flying solo") or off-site in a colocation facility ("going colo"), monitoring the temperature and humidity of the operating environment of IT hardware is a low-cost means of ensuring the maximum performance, efficiency, and uptime of the equipment running in the datacenter. The importance of keeping a close watch on environmental measurements cannot be overstated. Logging and trending environmental data can tell if the HVAC systems of the data center are working correctly, whether sufficient airflow is reaching the IT loads, as well as potentially warning of what systems/racks may be overloaded. Intelligent PDUs offered by Server Technology and Raritan deliver an unparalleled level of integrated functionality for environmental sensors. Located on and within the IT rack and visible through the PDU network interface, they enable a granular look within the data center at temperature, humidity, air pressure differential, floor moisture, and dry contact closure sensing.

PHYSICAL SECURITY

Some PDUs offer support for rack door access control, helping you ensure that even if some third-party such as a remote-hands operation tries to access your IT cage in the colo facility, they will only be able to access the assets in a rack that you can remotely control and enable. All activity at the rack is logged, making it easier to audit access history and meet regulatory frameworks.keyboard-video-mouse (KVM) switch, or else some form of serial console.

USB CAMERA

INTELLIGENT DOOR SENSOR

MANAGE SENSOR DATA WITH PDU CONTROLLER

ASSET MANAGEMENT TAGS

ELECTRONIC SWING HANDLE

ASSET MANAGEMENT

A remote colocation data center with continually shifting assets can be difficult for the IT team to track and maintain. Knowing what loads are where within the data center can help simplify the process of capacity planning, along with ensuring every asset is being fully utilized. Using an asset management system makes knowing the locations of all rack-mounted data center equipment a breeze.

One of the most frequently heard complaints about implementing a data center infrastructure management (DCIM) software tool is the amount of effort required to enroll assets into the tool, and then maintenance of the DCIM database over time as systems are added, removed, or moved about within the data center. Combining an asset management system (AMTs + AMSs) with a supported DCIM tool greatly simplifies the upkeep of the DCIM as the data center is operated and modified over time.
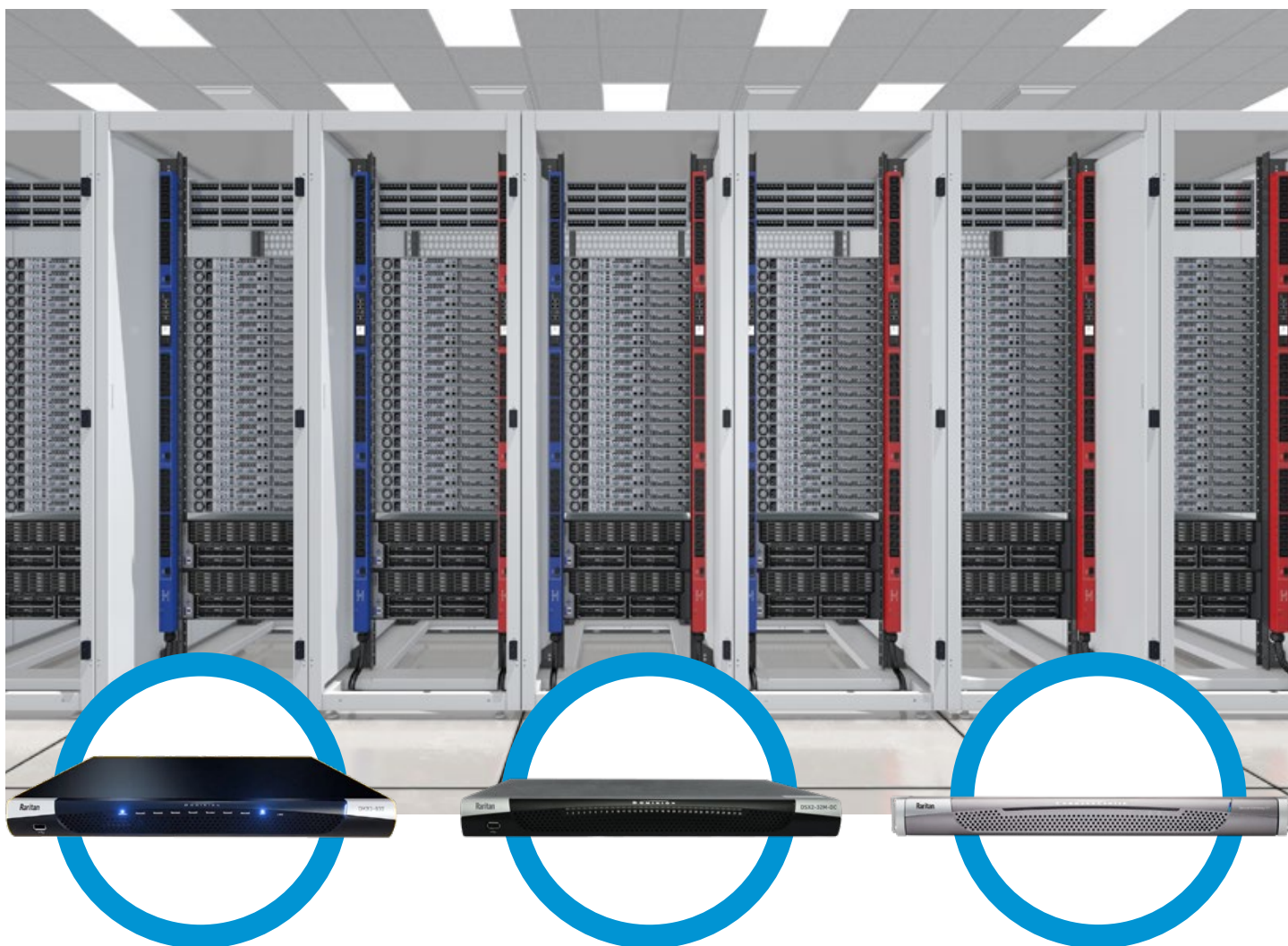
KVM AND SERIAL CONSOLES

As part of the move to a colocation facility, most IT teams will take a careful look at out how to provide multiple paths to the control interfaces of their hardware. Good data center design and engineering practice demands it. The most reliable means of achieving the needed redundancy is through the selection of either a keyboard-video-mouse (KVM) switch, or else some form of serial console. The Raritan brand of Legrand offers highly reliable, industry leading technology for both KVM and serial consoles.

CONCLUSION

Choosing a manufacturer that can support your company's data center choice, whether to build a data center ("fly solo") or move your IT assets into a colocation facility ("go colo") doesn't have to be difficult. Working with a vendor with a broad portfolio of data center products makes the decision easy.

APPENDIX

Inoc.net. Audited; Trusted; Redundant; Secure; Uptime; Security; Accessibility

Equinix. Reach everywhere. Interconnect everyone. Integrate everything. One connection — multiple clouds.

QTS. Cloud-ready colocation, on-demand. Redefining the data center. Visibility. Real-time control. Interconnectivity. The power of a software-defined data center.

Digital Realty. Data centers. Interconnection. Colocation. Highly reliable power and cooling solutions, physical security, and an ecosystem of partners.

Switch. Tier 5 Platinum Colocation at tier 2 pricing.

CyrusOne. Proven, Innovative Technology; Exceptional Service; Flexible and Scalable; Built for Tomorrow, Ready Today.

Telehouse. Reliability; Expertise; Global Reach; Service

NTT. Global. Managed. Uptime guaranteed. State-of-the-art security. Safety. Performance. Reliability. Carrier-class.

China Telecom. Reliable, engaged, global, tailored, one-stop solution, flexible

LEGRAND BEYOND THE PDU

More than just the largest vendor of intelligent PDUs worldwide, Legrand also offers a broad range of IT cabinets, enclosures, network cabinets and racks, patch panels, patch cords, jacks, cross connects, cable trays, raceways, runways, cooling and containment solutions for the data center.

Electrorack. CoVault, Eclipse, Barracuda and Matrix enclosures and IT cabinets

Quiktron. Copper and Fiber Solutions — patch panels, patch cords, fiber cassettes, accessories and tools

Ortronics. Mighty Mo GX, Q-Series, and LX network cabinets, filler panels, Copper and Fiber Solutions — patch panels, adapters, jacks, connectors, fiber enclosures, cross connects, and fiber cleaning tools, fiber raceways, runways

Cablofil. Wire mesh cable trays and accessories

Raritan. PX3 and PXE intelligent PDUS, rack transfer switches, sensors, asset tracking, KVM and serial consoles

Server Technology. Build Your Own PDU (HDOT), sensors, transfer switches and -48VDC PDUs

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