



Physical Infrastructure

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Introduction

This document reviews the Surebridge infrastructure and systems used to deploy and manage outsourced enterprise application solutions in a secure, reliable and highly available manner.

Data Center

The Surebridge Data Center is a state-of-the-art facility designed specifically to deliver enterprise business applications. The Data Center is located within the Surebridge Bedford, NH office and includes a 24x7x365 Network Operations Command Center, Research and Development lab, education facilities and a technical support help desk. The Data Center was built in 2000 according to meticulous specifications expressly for Surebridge. Surebridge researched and selected Data Center components and products from vendors considered outstanding in their field. Each component individually contributes to maintaining highly available applications.

Redundancy

The Data Center infrastructure is equipped with numerous redundant systems intended to ensure environmental reliability including power systems, HVAC, fire suppression systems, and cabling systems.

Power

The Surebridge Data Center power is isolated from the rest of the building and is fully grounded on an isolated ground. This design prevents possible electrical abnormalities in other parts of the building from affecting the Data Center. Electricity enters the building through two separate feeds with two separate transformers, proceeds through a UPS battery backup system, through switchgear, and then to the Data Center. Under the 30-inch raised floor of the Data Center, there are two separate pairs of receptacles that connect to two separate power distribution units in case a line should fail.

Within the Data Center, each server rack has two pair of redundant circuits, all on battery backup and generator backup. For capacity planning and redundancy, every rack has two pair of 30-amp receptacles and an uninterruptible power supply (UPS). These components are connected into a centralized UPS, for the entire Data Center, comprised of two 400-KW UPS units. The backup battery engages for the interim time (several seconds) between loss of power and the automatic starting of the backup generator. It can be refueled while running, so the Data Center can run indefinitely on the backup system. The 800-KW backup generator is tested each week by the operations team as a precautionary measure.

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Surebridge built a power conditioning system that filters all the power coming into the Data Center. This ensures that customers receive a service powered by a pure and stable source. The Surebridge UPS system conditions power through a double conversion system, which takes the alternating current (AC) power from the power company, converts it into direct current (DC) power, converts it back into AC power, and then supplies it to the Data Center. This process smoothes fluctuations, dips, brown outs, spikes, and surges so the sine wave for the alternating current supplied to servers is always perfect.

HVAC

The Data Center is equipped with a redundant cooling system consisting of eight air handlers, which can combine for a total of 240 tons of cooling capacity. Surebridge employs an N+1 system for the entire Data Center, maintaining at least one extra of every component of the cooling system, which assures continuous operation. The cooling system's power is backed up by the generator so optimal temperature can be maintained even in a power outage.

Within the Data Center, the cooling system forces air through the 30-inch raised floor. Vented floor tiles are purposely placed adjacent to each server's air intake system to facilitate cooling. Valves in the HVAC system are also strategically placed so if a problem occurs it can be isolated and resolved without affecting the entire HVAC system. This planning further facilitates an optimal physical environment for the Data Center.

Fire Suppression

Surebridge has multiple, redundant fire suppression systems within the Data Center. The primary system is an Inergen gas fire suppression system. If heat or smoke is detected within the Data Center, the Inergen gas is automatically released. It lowers the oxygen level in the room enough so that nothing will burn. This inert, nontoxic gas does not leave a residue, nor does it harm equipment or people.

The secondary system is a pre-action, waterbased, multiple-valve system. This system is filled with compressed air, not water. Therefore, there are no wet pipes within the Data Center or on the floors above the Data Center. Within the system, a valve separates the compressed air from the water, and a compressor maintains the pressure of the compressed air. When the first stage of this system is triggered, a housing opens the valve, but water does not flow. To trigger the second stage of this system, the temperature must get hot enough to melt a filament within the sprinkler head (165 degrees). If that filament melts, it allows the compressed air in the system to escape. Water fills the pipe and is released from the sprinkler heads from which the filaments have melted. The unique benefit of this system is that only the sprinkler heads that have melted filaments will release water, so the fire suppression is very controlled and localized.

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Water Detection

Surebridge has a moisture detection system installed in the Data Center to alert technicians immediately of the presence of water under the raised floor of the Data Center. The system will detect and report the exact location of the water. It will report the problem both locally, via an audible and visual alarm in the Data Center, and remotely to the building automation system console in the Network Operations Center, and via pager to the NOC staff.

Physical Security

Surebridge has multiple physical measures in place for the Data Center as well as for access to the entire building. A closed circuit television system is used to monitor all access to the building and the Data Center. Network Operations Center personnel are physically on site 24x7x365 monitoring physical and logical security systems.

Other systems include a fob access system, PIN code access, and several other proprietary physical security measures.

Plant Automation Systems

The equipment maintaining the physical environment of the facility such as power, transformers, battery life, switchgear, UPS, HVAC pumps and compressors are monitored by automated systems 24 hours a day. If environmental thresholds are exceeded (such as the temperature of a room or voltage), these systems alert the staff within the Data Center that a potential problem may be occurring.

Cabling

Surebridge installed a data-cabling infrastructure that exceeds current cabling standards, and meets the next generation of cabling standards. Data and power cabling running under the 30-inch raised floor allow for superior cable management and easier expansion. It also eliminates the possibility of tripping over cables, which may cause system downtime or damage.

There is a CAT5E, 100-megabit, full duplex connection between a customer's servers, and from the servers to the routers. The routers themselves have a multiple gigabit backplane connection between them. This connects to an OC-3 SONET ring, which is scalable to 155 megabits per second.

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Networking Equipment

The networking infrastructure within the Data Center is highly scalable. Surebridge worked closely with Cisco to design a system that can support thousands of companies with high levels of availability over a multigigabit Ethernet backbone. Cisco is the recognized leader in high-end networking equipment, and provides Surebridge a 24x7 guaranteed service contract in the case of any type of hardware failure. There is also a high level of redundancy built into the networking equipment, redundant power supplies, management modules, and routers.

Connectivity

Surebridge has contracted with AT&T for its communication requirements. The communications system runs over an OC-3 self-healing fiber optic SONET ring. The SONET technology allows fail-over to another leg on the SONET ring in the case of a cable being cut, without any loss of connection for customers. Two separate fiber optic cables leave the building in two separate directions to the local exchange carrier. These cables never come within 25 feet of one another. This fiber optic system provides a high degree of redundancy to the Internet. A total of 155 megabits of bandwidth is available including Internet, VPN and frame relay services.

Build Room

The Build Room is where the servers are prepared for the Data Center before they go into production. It serves as a staging area where systems can be configured quickly and efficiently. Servers are unboxed, assembled, burned-in, and installed with operating system and application software according to the Gold Standards developed by the Research & Development lab. Once a server is built and burned in, it is run through diagnostic tests for and evaluated against a series of checklists and quality assurance tests. When the server has tested successfully, it is mounted onto a rack. This is the final stage before releasing a customer's production environment into the Data Center.

Network Operations Center

The NOC monitors all of the servers and services running within the Data Center. To provide redundancy and adequate bandwidth to monitor all of these components simultaneously, there are multiple gigabit Ethernet links between the Data Center and the NOC that terminate on multiple, redundant pieces of Cisco equipment.

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About Surebridge

Surebridge, the leading provider of outsourced enterprise application solutions for middle market companies, delivers brand name application choice and affordable strategy, implementation and outsourcing services. Surebridge's complete portfolio comprises ERP, CRM, eBusiness integration and productivity applications, driving efficiencies into business processes and adding value to customers, partners, shareholders and employees alike. Its full service offerings include software selection based on business need, rapid and precise application deployment, upgrade services, secure hosting, application management and continuous business improvement solutions. By providing outsourced business-critical enterprise-level applications, Surebridge provides tremendous cost savings to its customers. In addition, Surebridge's offerings are enhanced with a constant eye toward value through high-touch customer service. Surebridge offers vertical expertise in the manufacturing/distribution, financial services, healthcare/pharmaceutical, services, publishing/media & communications, and public sector industries. The company was founded in 1997 and is headquartered in Lexington, Mass. For more information, please visit www.surebridge.com, or call **781-372-3222**.

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