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Data Center Management Infrastructure & Managed Services Outline

Introduction

Thank you for your interest in the SmarttNet Data Center & Managed Services.

SmarttNet Data Center is located in Burnaby, British Columbia, Canada. We are centrally located in one of Western North America's largest fiber distribution points, about ten minutes from Vancouver. For a full description of our company as well as its history, please visit our website. You may find our contact information at the end of this document.

Our facility has recently undergone a twelve month planned expansion, renovation and upgrade to meet some of the industry's highest standards of data management, security and reliability.

The brief outline below should answer most of your questions regarding any design provisioning, network redundancy and security issues. In the event of any outstanding questions, please feel free to contact our Marketing Manager, **Martin Wong**.

Provisioning & Design

Electrical Grid

SmarttNet Data Center electrical grid is composed of 2 separate circuits to each of our managed racks. Our racks are standardized at 42 Units. Each housing can connect to 2 (15 Amp each) separate breakers providing redundancy. Both circuits have automated UPS (Uninterruptible Power Supply) and power generator fail-over.

For customers wishing extra privacy, a managed customer can occupy their own rack with its own dedicated breaker to prevent any unwanted power consumption by unknown devices on the same breaker.

UPS & Generator

The UPS has maintenance management switching permitting maintenance on the unit without disruption to the power grid. The UPS also has automated fail over sensors – if it detects variations in power supply from its power source, it will automatically send a signal to the power generator, which will switch on and gradually regulate the power to the circuit. If brownouts occur, the UPS will regulate power itself automatically as well.

The UPS can remain active for approximately eight minutes (depending on the load); it typically takes the power generator five minutes to become fully active and act as primary power source. This provides a large margin for the switch over, avoiding any unplanned outage. The system is completely automated.

The UPS comes with redundancy built in. The system undergoes scheduled maintenance and bi-annual testing runs to ensure operation during actual interruption. A service level agreement has been signed in order to ensure rapid response in the event of primary and secondary component failure.

The diesel generator is housed in a separate environment nullifying any concerns posed due to its liquid fuel source to sensitive computer equipment. The generator can run continuously for eight hours without re-supply of fuel.

The generator undergoes bi-annual testing and maintenance to ensure its continued operation. A supplier of diesel fuel has been secured in the event that an outage exceeds operational standards and a re-fuelling of the generator is required.

HVAC & Environment Control

SmarttNet maintains a median temperature of 20-22 degrees Celsius in our data center irrespective of the occupation level of the racks. The rack layouts are designed according to a

Hot/Cold aisle system which does not require or use a raised floor. The AEAS (Automated Environment Alert System) notifies staff of any temperature variations above 22 degrees Celsius.

The entire HVAC system has dual components in the event of a failure. The only component without automated fail over is the air intake motor, which can be replaced within ten minutes while permitting the data center to operate without interruption. The entire system undergoes bi-annual review and maintenance cycle to verify optimal operation.

Fire Suppression & Other Preventative Measures

The Data Center has a (PAFSS) Pre-Action Fire Suppression System designed to:

1. Prevent accidental tripping of the system by requiring multiple fire causing inputs
2. Automated notification of any danger- permitting an orderly shut down of systems prior to initiation of fire suppression (preventing permanent system damage)

All access points have 2+ hours of fire rating. The floor is composed of solid concrete for a zero static environment and reduced chance of Zinc Whiskers[1]. All illumination within the environment is provided by fluorescent strip lighting to reduce heat generation.

Security & Access Controls

The SmarttNet Data Center has 16 closed circuit cameras covering all aisles, entry & exit points, as well as external environment of the building. Access will be controlled through biometric reader and escorted entry by one of our representatives.

Standardized Tier System Comparison Chart

The uptime institute and several other sources maintain a standard description of various levels of Data Center integrity. Below is a comparison of some of the most commonly used indicators and SmarttNet's position within this tiered system.

	Tier 1	Tier 2	Tier 3	Tier 4	SmarttNet
Power Delivery Paths	1	1	2	2	2
Air Conditioning	Yes	Yes	Yes	Yes	Yes
Raised Floor	No	Yes	Yes	Yes	No
UPS + Power Generator	Maybe	Yes	Yes	Yes	Yes
Redundancy	N	N+1	N+1	2(N+1)	N+1
Concurrently Maintainable	No	No	Yes	Yes	No
Building Type	Tenant	Tenant	Standalone	Standalone	Standalone
Site Availability	99.671%	99.749%	99.982%	99.995%	99.749%
Security Cameras	Maybe	Yes	Yes	Yes	Yes (16)
Months to Implementation	3	6	15-20	15-20	12
Staffing	1 Shift	1 Shift	1+ Shift	24/7	1 Shift + On Call (24/7)

Network Design

Network built on multi-tier model:

1. Layer 1: Core Layer – Cisco 6500 fail-over & hot swappable
2. Layer 2: Aggregation/Distribution Layer Cisco 6500 fail-over & hot swappable
3. Layer 3: Access Layer Cisco 3550 fail-over

[1] Zinc Whiskers are a phenomenon known in the Data Center industry. They are small zinc fibers which collect and accumulate on raised flooring over time due to hardware maintenance, screwing/unscrewing of servers and other normal data center activity. For more information on this phenomenon and white papers on the topic, please send us an email.

Built in Redundancy:

Layer 1: Dual backbone from 2 independent upstream providers with automatic fail over switching
Layer 2: Multi-Path OSPF switches to eliminate single point of failure
Layer 3: Access to multiple Cisco 3550 in event of hardware failure

Each managed rack has an allotment of up to 2 Cat 6 (1 Gig provisioned) connections per 1U Server which are in turn connected to separate access layer (Layer 3) switches. All equipment in every level has redundant switching.

All cabling for the racks has been pre-run and tested and verified for 1 Gigabit throughput. Network distribution nodes and cabling are kept separate from power distribution to prevent interference. No further cabling is required in the data center, reducing maintenance activity and adding security to your equipment.

To ensure business continuity for our customers, we have established Next Business Day Delivery with all of our network equipment vendors (Cisco, Dell, etc.) either on the OEM level or with local distributors. In the event that any redundant system endure a catastrophic discontinuity of service, one of these sources will be available.

Customer Management & Support Services

Complimentary Services

We understand that you are trying to run a business and that you have a lot on your mind. We want you to succeed and as a result are happy to provide complimentary Remote Hands support to help reduce some stress. If you require a reboot or a read-out of your screen messages, we are happy to assist. For more assistance, such as hardware replacement, troubleshooting including patching and other services, please review our Managed Services below.

Managed Services

SmarttNet provides full on-site management support for customer servers. Specific management requirements fall into two categories:

1. Design, Implementation & Management

    i) Customer requires consultation and document outline for which hardware and software to use for their particular needs
    ii) Customer requires setup and configuration of hardware and software
    iii) Customer requires management, maintenance and emergency support for hardware and software

The array of applications which are serviceable in this category range from simple small office Exchange environments to complex, multiple office, VPN based CM (Customer Management) services. The consultation process for integration of such a system is detailed, with every step planned and reviewed. Please inquire for qualification details.

2. Management & Support

    i) Customer provides hardware & software
    ii) Customer requires an on-call & on hand service

There are sub-sections to each category which are explored and tailored according to the requirements of the customer. Please inquire for more detailed consultation process.

Virtual Servers

Some customer software requirements do not justify the purchase and maintenance of expensive hardware. For such situations SmarttNet is able to provide the security of our premises, the

expertise of our professionals and the timeliness of our service in a shared virtual server environment where your application can perform its functions. Please inquire for further details regarding our the SmarttNet Virtual Private Server (SVPS) service.

Backup & Storage

Data integrity is further maintained through our data backup system. There are three levels of backups depending on customer management level:

1. **MyBackup – Personal & Small Business based backup for individual users:** System scans designated personal computer folders or entire system as designated by user and data is backed up automatically and stored remotely in our Data Center. Systems is manageable by user, configurable for multiple backups. User is assigned certain amount of disk space according to plan and may write/re-write and use according to provisioning.

2. **Software based backup (ELMS) for Entry Level Managed Services:** Automated backup as described above which is then written on a secondary drive in the event of primary device failure.

3. **Enterprise Backup Services (EBS):** Automated tape backup with secondary backup unto hard disk which is kept at secondary location. Tape backup procedure exists to ensure data integrity so information is not transferred on the network.

Support & Emergency Services

As previously mentioned SmarttNet maintains SLA (Service Level Agreements) with all major vendors, network feeds, computer hardware, mechanical infrastructure and software providers for its Data Center. With this support structure in place the integrity of the network and your data is maintained.

Further to its relationship with vendors, SmarttNet maintains continuous observation of its Data Center environment and health of its systems. Automated notification is sent to multiple technicians 24 hours a day, 365 days a year in order to ensure business continuity. Furthermore, the premises have biometric security* and security cameras which feed their data both on and off site.

Next Step

Choosing a data center and an appropriate managed solution is a complicated procedure requiring the utmost care. SmarttNet has experience in this field with a proven customer base. Our recent infrastructure upgrades are a commitment to maintaining our level of service.

We encourage you to communicate with us and ask any questions you may still have about our services including quotations. We hope to create a strong working relationship and wish you much success in your business endeavor.

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