Migrating network infrastructure routing term paper samples

Business, Company

Super-W is a large retail company operating in the Midwest US. According to the case study, the company has been traditionally operating with a single corporate campus location and a distribution center supporting twenty retail locations. Recently, it acquired several businesses increasing its large distribution centers to four of which supports more than 200 retail locations. This desires an internetwork that efficiently serves these locations as well as provides the desired security measures. An upgrade is required with key considerations given to redundancy and security. In order to satisfy business functions, an uptime of four 9s is desired.

Acting in my capacity as the network engineer together with my team of five network analysts and a project engineer, we desire to develop and implement a migration strategy that will minimize client and employee impact. Funding allocated for the project is $500, 000 and the process is expected to proceed in phase.

Developing the correct routing infrastructure is important in order to keep a network operational. The routing protocols implemented at any instance should reflect high security and redundancy considerations. In this paper, I will recommend a routing infrastructure that will scale up the network from a single corporate campus with twenty distribution centers to two hundred distribution centers. The migration process will be done in a manner than gathers for the interest of clients and employees, thus, minimal disruption of operations is desired. It is desired that 99. 99% degree of availability will be attained. This implies a 0. 01% chance of unavailability or approximately 1 minute business disruption per year.

The first task in thus assignment involves the process of upgrading the

routing infrastructure. This is the core step in a disruption-free upgrade path for the network infrastructure that delivers performance gains, advanced routing functionality and predictive control over ongoing operations.

Upgrading Procedure

Super-W is pleased to announce an upgrade of its network infrastructure in order to support four large distribution centers that will effective serve more than 200 remote locations. This is as a result of the recent acquisitions processes that took place in the company. The upgrade is allocated $500, 000 worth of resources together with an upgrade team made up of four network analysis and one project manager. It is expected that the upgrade will deliver immense benefits to the employees of the company as well as the clients. First, increased redundancy and zero chances of network failover will be witnessed. Second, there will be increased network capacity and support for numerous Gigabit ports. Finally, the new infrastructure will support full native IPv6 as well as the ever expanding routing tables.

The upgrading procedure will take a period of four days while testing and maintenance will commence after the upgrade and continue for a period of three months. Upgrading will commence on Thursday and continue until Sunday in the morning.

The upgrade process will commence as follows; All Super-W customers and clients will be migrated to a new network infrastructure. These includes access switches, transport and transit circuits. The process is scheduled to proceeds as follows;

All customer access switches will be migrated to new infrastructure starting Thursday 11. 00 PM until Sunday 06. 00AM. In spite the fact that the team

has spent considerable time devising a migration strategy that minims customer disruptions, it is expected that a 5 minutes disruption will be unavoidable for every client. Every client using the network will experience an approximately five minute outage when their particular access switch is being transferred to the new network core infrastructure. After the transfer, testing and maintenance will be conducted to ensure that the system is working as desired. Testing will be conducted after migration while operational maintenance is scheduled later on when the system is running, thus, there is no anticipated disruption to clients and employees. Other maintenance procedures will be announced as required when the instance to move the transit and transport circuit to the new core network infrastructure is reached.

After the upgrade has been effected, IPv6 configuration will take place as per each locations needs. This will be done in a period of three weeks pending the definition of security policies and individual user needs. Thus, the project is expected to run for four months from January to April 2014.

Routing protocol

OSPF is a proprietary Interior Gateway Protocol based on Internet Protocol internetworks. OSPF distributes routing information between autonomous systems by studying the short path and the link state technology. In that respect, it is not desirable in this case.

Border Gateway Protocol is another protocol that routes traffic between autonomous systems across the internet. This protocol is common among service providers.

Finally, the third protocol under consideration is Cisco's Proprietary Enhanced Interior Gateway Routing Protocol. This protocol combines the advantages of link state and distance vector protocols. It utilizes Diffusion Update Algorithm for easy and quick convergence.

My recommended protocol for Super-W network is EIGRP. This is due to the following reasons;

EIGRP is an advanced protocol that supports IP, Novel Ware, and AppleTalk. It can be implemented at a fraction of the cost required for other protocols and in less time. In addition, it provides the functionality that will accord Super-W the stabilization it requires. Super-W requires a system that is stable to support its business processes. Provided the current state of operations following the acquisitions, Super-W will risk running at a loss if implemented protocol leads to an unstable system. This will mean frequent maintenance which will translate to additional costs. Implementation of the protocol will also accord the required platform for further scaling in future. A budgetary restraint is one reason for the choice of this protocol. Given the budgetary limit of $0. 5 million it would be prudent to adopt a protocol that delivers with limited resources. The business had been utilizing other protocols based on Cisco and for this reason, implementing EIGRP will economic significance.

Routing Infrastructure Topology

EIGRP uses bit-wise sub-netting and variable length sub-network masks to minimize address space and achieve efficient addressing for a company in internetwork. Route selection in EIGRP is done via route metrics that

compare the best route from a selection of the possible routes. There are separate metric values used for bandwidth, delay, reliability, and load. By default, EIGRP determines the best route utilizing the minimum bandwidth of each hop in the path including a media specific delay.

An implementation of EIGRP in the case of Super-W will require a mesh network topology comprising of 200 nodes each of which is connected to two to four neighboring routers. Using a DUAL convergence algorithm, convergence is achieved quickly and efficiently.

EIGRP will function in the following mechanism. First, routers will determine their neighbors routing table to compute a new route to a destination. This applies for a feasible route. In case a feasible route is not known based on previous routing information, an EIGRP router is automatically activated to send out queries to its neighbors requesting for alternate route information. Second, once route queries have been propagated to the neighbors, the router running EIGRP receives full routing table from the neighbors it makes contact with. Any subsequent changes made to the routing table will only be executed by routers directly linked with the change.

Dual Convergence will be determined based on destination R1, R2, and R3. This represents the locations of the distribution outlets. The cost to each node is computed and the result used to determine the appropriate querying process. Route computation is determined based on such parameters as router memory usage, security, bandwidth and processing power.

Router configuration will be done as illustrated below. All the routers in the network will be configured in the same way, where each router must declare it’s directly connected to the network to be seen by other routers. All routers

in the network will be running EIGRP and will be configured with the same process number.

Cisco routers implementing EIGRP have enhanced security features that eliminate accidental or malicious routing disruptions resulting from hosts in the network. There are also additional controls that ensure that irrelevant learning or propagation of routing information is not successful.

The implemented solution will ultimately provide fourth class availability. Anticipated downtime in the case of Super-W after the implementation of the routing upgrade is expected to be 99. 99%. By default, availability is expressed in terms of percentage of reliability. Percentage of reliability is determined by uptime, downtime, response period and the time required to recover from a downtime. Thus, in order to ensure an all running system, response, and downtime and recovery time should be significantly reduced. In this case, the system will be 99. 99% reliable with an expected 0. 01% downtime. This anticipated downtime translates to 1. 01 minutes in a week or 4. 32 minutes in a month. This instance of downtime is insignificant in impacting business processes across the organization.

Conclusion

The paper has outlined the process of upgrading the network infrastructure routing. First, an execution plan has been outlined to guide in the upgrade process. Second, EIGRP protocol has been chosen as the preferred option due to cost, ease of implementation and security it accords. Since resources are limited as well as man-power, EIGRP is the preferred option. Finally, it has been shown that the implementation of the project will accord Super-W

99. 99% availability. This translates to only a minute of downtime in a week which is favorable to the business processes.

References

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