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Advanced Computing Company (ACC)

Request For Proposal (RFP)

For ACC Project On

**“A Structured Data Network
Design for ACC”**

Rabi' II 1435H
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1 Introduction

ACC is a computing company that specializes in providing advanced computing solutions to a wide spectrum of customers. It has 4 sites in Saudi Arabia with headquarter in Riyadh. ACC employs 747 people. It has customers all over the world.

ACC is constantly increasing its services to support its customers, and increase its profit. It plans to upgrade the network used in the headquarter and interconnect it with the other branches. The other branches do not have a network installed yet. The data network will provide better support to its employees, customers, and suppliers.

2 Background Information

There are three buildings for ACC headquarter in Riyadh. In addition, the company has 3 branches in Dhahran, Al-Madinah, and Jeddah.

The ACC headquarter has 3 buildings. The first building has 5 floors and 177 employees. In the ground floor, there are 25 IT employees. In the first floor, there are 7 finance employees, 13 sales employees, 15 marketing employees, and 5 Human Resources (HR) employees. In the second floor, there are 45 computing personnel, including 23 computer engineers, 15 computer scientists, and 7 lab technicians. In the third floor, there are another 8 computer engineers, 5 computer scientists, 23 lab technicians, and 5 documents writers. In the fourth floor there are 15 computer engineers, another 10 lab technicians. There is also a large space that can be used for the new network, if needed, on the ground floor. There is also a testing lab located in the fourth floor. The Director of ACC is located in the fourth floor. The manager of every department is located in the same area as his department employees (Managers have been already accounted for in the numbers provided).

The second building of the ACC headquarter has 4 floors and 150 employees. In the ground floor, there are 36 computing personnel, including 18 computer engineers, 9 computer scientists, and 9 lab technicians. In the first floor, there are 9 finance employees, 13 sales employees, 13 marketing employees, and 8 Human Resources (HR) employees. In the second floor, there are 43 computing personnel, including 17 computer scientists, 20 computer engineers, and 6 lab technicians. In the third floor, there are another 6 computer engineers, 5 computer scientists, 13 IT employees, and 4 documents writers. There is also a large space that can be used for the new network, if needed, on this floor. The building is about 100 meters away from the first building.

The third building of the ACC headquarter has 3 floors and 100 employees. In the ground floor, there are 35 computing personnel, including 20 computer engineers, 10 computer scientists, and 5 lab technicians. In the first floor, there are 5 finance employees, 10 sales employees, 11 marketing employees, and 4 Human Resources (HR) employees. In the second floor, there are 35 personnel, including 12 computer scientists, 15 computer engineers, 5 lab technicians, and 3 documents writers. There is also a large space that can

be used for the new network, if needed, on this floor. The building is about 1.5 kilometers away from the first building.

In Dhahran, the ACC branch is a building with 3 floors and 120 employees. In each of the ground and first floors, there are 38 computing personnel, including 18 computer engineers, 8 computer scientists, and 12 lab technicians. In the second floor, there are 13 IT employees, 15 sales employees, 12 marketing employees, and 4 documents writers. There is also some space that can be used for the new network, if needed, on this floor.

In Al-Madinah, the ACC branch is a building with 3 floors and 75 employees. In each of the ground and first floors, there are 13 sales employees, and 18 marketing employees. In the second floor, there are 7 IT employees, and 5 sales employees, and 1 documents writer. There is also some space that can be used for the new network, if needed, on this floor.

In Jeddah, the ACC branch is a building with 4 floors and 125 employees. In each of the ground and first floors, there are 40 computing personnel, including 10 computer scientists, 21 computer engineers, and 9 lab technicians. In the second floor, there are 14 sales employees, 18 marketing employees, and 3 documents writers. In the third floor, there are 10 IT employees. There is also some space that can be used for the new network, if needed, on this floor.

3 Project Goals and Scope

There is an existing network in the headquarter building in Riyadh. The company's goal is to upgrade the existing network to support more applications, and to design a company-wide internetwork that connects all the branches to the ACC headquarter. This will provide connectivity and access to different services (e.g., Internet, e-mail) to all the buildings in ACC.

3.1 Business Goals

- Increase profits and administrative efficiency by implementing a network that supports information sharing and easy access between ACC's employees.
- Securely store all documents (employees' personal information, technical reports, computing processes, sales and marketing strategies, etc.) as they are the main asset of the company.
- Provide an infrastructure that supports all employees.
- Provide a network that will let employees share ideas, communicate, and interact more easily to further improve efficiency within the respective ACC groups.
- Provide a network that delivers high capacity, high availability, good performance, scalability, security, and compatibility.

- ☒ Provide scalability that encompasses new applications and services, as well as the requirements for new buildings.
- ☒ Allow salespeople and marketing employees to securely access ACC sales information stored in an Oracle database from anywhere using their laptops.
- ☒ Provide access to remote branches.
- ☒ Minimize the costs associated with maintenance, operations, and upgrades.

3.2 Technical Goals

- ☒ All users must have access to the Internet.
- ☒ Maintain continuous communications between all the buildings in different locations.
- ☒ Any network user, in any building, must be able to communicate with any other user via e-mail.
- ☒ Network-related services needed include: file sharing, printing, email, Internet access, calendaring, and database access.
- ☒ Centralize all services and servers to make the network easier to manage and more cost-effective.
- ☒ Logical isolation between departments of the same building is needed.
- ☒ Each department within each building needs to have the flexibility of moving their staff from any location to any other location within the same building.
- ☒ Provide a network that supports the usage of multimedia applications, including a video-conferencing system.
- ☒ Support of Voice over IP (VoIP) and video conferencing on the same network.
- ☒ For each building, provide a wireless access that operates within the building's walls.
- ☒ Salespeople and marketing employees using their laptops must first be authenticated before getting access to the network. They should be able to access all the ACC data network services and resources from anywhere using their laptops.
- ☒ Provide security to protect the Internet connection and internal network from intruders. Higher security is required for information on the internal network.

- ☒ Some level of reliability is required for the whole network. More reliability is needed in the backbone.
- ☒ Provide secure access for customers to electronically make orders and check on their status at any time.
- ☒ Design a network that uses currently available technologies from the WAN service providers in the region.
- ☒ Design a network that will scale up as new high-bandwidth applications are added in the future.
- ☒ Internet connection must support new applications and the expanded use of current applications.
- ☒ Implement storage and disaster recovery solutions. Storage can be implemented using a public **Cloud Computing** facility.
- ☒ Improve the manageability of the network.

3.3 Project Scope

This document is a Request For Proposal (RFP) for the data network design and upgrade, and for the procurement of equipment and works that are required to achieve the company's goals. ACC invites the vendors to study and submit a network design solution that fully addresses the network requirements described in this document.

4 Existing Network and Applications

There is an existing network in the headquarter building in Riyadh. The company's goal is to upgrade this network to support more applications, and to design a company-wide network that connects all the branches to the ACC headquarter.

The current network connects the ACC headquarter devices and stations. A router in the ground floor is connected to a layer-2 switch on each floor. The router also connects to the Internet, and uses packet-filtering to act as a firewall. A 2-Mbps E1 link is provided by STC for Internet access. The network uses one class C address (210.11. 12.13). A cluster of five multiprocessor UNIX servers (file/print, database, and other IT applications) and five laser printers are connected to the network. The networking protocol is TCP/IP and the LAN protocol is 100BaseT Ethernet.

The current ACC network is used to:

- Send and receive emails
- Access information on the Internet

- Access printers
- Store files in the file server

All major file servers are connected to the router, including the Novell and Oracle database servers.

For all the ACC branches, there is no network installed, and connection to the Internet is available through three dedicated PCs with 512kbps ADSL line; a user must physically go to the IT department to use the Internet connection.

All ACC buildings are already wired according to ANSI/TIA/EIA-568-A standard, and are equipped with cat-5 cabling.

There is no network connectivity from ACC branches to the ACC headquarter network.

5 New Network Requirements

The following are the applications required for each group of employees:

For all employees:

- Windows 7 PC applications: e-mail, calendaring, web browsing, file sharing, and printing.
- Intranet access.
- Oracle database access.
- Videoconferencing.
- VoIP.

Computer engineers:

- Requirement analysis tools.
- Design tools.
- Simulation tools.
- Engineers have two computers on their desks: a Windows 7 PC for office work and a high-performance Windows 7 workstation for analysis and simulation tools.

Computer scientists:

- Requirement analysis tools.
- Design tools.
- Scientists have two computers on their desks: a Windows 7 PC for office work and a high-performance Windows 7 workstation for analysis and design tools.

Lab technicians:

- Requirement analysis tools.
- Logging tools.

Documentation writers:

- Documents sharing.

Sales & Marketing employees:

- Laptop connection from anywhere and secure access.
- The sales order-entry and tracking system runs on a cluster of two redundant servers. Sales and marketing personnel use their PCs to access this system.

IT:

- Network management tools, including configuration, fault, performance, and security management.
- IP address assignment should include laptops.
- Names or IP addresses can be used interchangeably to access any machine.
- Help desk information system in Oracle DB.

Finance:

- Financial modeling system uses an Oracle DB on UNIX machines in Riyadh. Financial analysts use applications on their PCs to access this system.

HR:

- Access to all employee information in Oracle DB.

Customers:

- Access to orders information in Oracle DB.

Other requirements for this design include:

- You may propose features, tools and programs to be added to the proposed requirements that will provide employees with better support in doing their work. All assumptions made have to be clearly stated in the RFP response document.
- Protocols recommended must be open (nonproprietary) standards.
- Structured cabling and cabinets - necessary information is required for:
 - Wall Mounted Cabinets. A cabinet shall house the following equipment.
 - Patch Panels (for UTP and Fiber Optic)
 - Socket Power Strip.
 - Network Equipment.
 - Rack Servers
- Scope of the electrical works:
 - It is the responsibility of the contractor to connect all power strips to ACC power panels. All works should follow NEMA standards. Please note that voltage rating in ACC is 110V AC, and all power plugs should be American Standard type. All the equipment, including the racks should be properly grounded.

6 Network Design Document: RFP Response.

The RFP response should be in the form of a network design document that includes the following:

- Executive Summary
- Project Goal
- Project Scope
- Design Requirements Analysis (including traffic analysis)
- **Simulation results for each application's *throughput* and *end-to-end delay* (before and after the upgrade), and for *WAN links utilization* (after the upgrade).**
- Logical Design
 - o Design alternatives and recommendations
 - o A network topology for the proposed design
 - o Recommendation for:
 - IP addressing of the network.
 - Routing protocols required.
 - Server placement.
 - Network Management strategies.
 - Other features listed in the requirements.
- Physical Design
 - o Market Survey
 - o Evaluation Criteria
 - o Information and prices of devices and services
- Feasibility of Implementation
- Project Budget
- Updated task assignment (who did what?)
- Assessment and Evaluation
- Appendix
- Summary