AUSTRALIAN COMPUTER SOCIETY

RECOGNITION OF PRIOR LEARNING APPLICATION - 2016

This document is required to be completed for all Recognition of Prior Learning (RPL) Application types and must be attached to the online application form under the RPL tab in PDF format.

In this document there are two sections that all applicants must complete –

- The Key Areas of Knowledge – Section 1
- The Project Report Forms – Section 2

RPL applications are for those applicants who do **not** hold a recognised tertiary ICT qualification and who have a minimum of 6 years of closely related experience. Please refer to the Summary of Criteria for further information.

This document provides the opportunity for applicants to demonstrate knowledge learnt throughout their professional experience.

Applicant Name	
Application ID (if known)	
Applicant Date of Birth	

SECTION 1 – KEY AREAS OF KNOWLEDGE

INFORMATION ABOUT THE AREAS OF KNOWLEDGE

Please read the following document to assist you in completing Section 1 of this document -The ACS Core Body of Knowledge for ICT Professionals (CBOK).

Applicants must detail the relationship between the selected Areas of Knowledge and their learning from their experience and qualifications. This section of the RPL application needs to be specific as to how and where the applicant has acquired the knowledge.

The ICT Key Areas of Knowledge:

Essential Core ICT Knowledge

Topic 1. ICT Professional Knowledge
Sub Topics are -
a. Ethics
b. Professional Expectations
c. Teamwork Concepts and Issues
d. Communication
e. Societal Issues

Topic 2. ICT Problem Solving
Sub Topics are -
a. Modelling Methods
b. Processes to understand problems
c. Methods and tools for handling abstraction

General ICT Knowledge

Topic 3. Technology Resources

Sub Topics are -

a. Hardware and Software Fundamentals
b. Data and Information Management
c. Data Communications and Networking

Topic 4. Technology Building

Sub Topics are -

a. Human Factors
b. Programming
c. Information Systems Development and Acquisition

Topic 5. ICT Management

Sub Topics are -

a. IT Governance and Organisational Issues
b. IT Project Management
c. ICT Service Management
d. Security Management

You are required to select one topic from the Essential Core ICT Knowledge (Topic 1 or Topic 2) and one topic from the General ICT Knowledge (Topic 3, Topic 4 or Topic 5). Please ensure you address at least 2 subtopics from each of the topics chosen. In the following expandable typing areas, explain **how you have acquired your in-depth knowledge** in these topic areas through your professional experience.

Important:

- **Identify the Area of Knowledge topic that you have chosen to explain by entering the name of the Area of Knowledge topic in the box.**
- **Explain, in the expandable typing area, how you have acquired the knowledge and illustrate the depth of that knowledge.**
- **You should NOT address all sub topics included in the Area of Knowledge in your explanation. Address at least TWO of the sub topics. Enter the sub topic name(s) in the box.**
- **Be clear and concise in your explanation.**
- **Limit each explanation to no more than one to one and a half pages.**

Essential Core ICT Area of Knowledge: Essential Core Knowledge • Ethics, • Professional Expectation • Teamwork Concept and Issues • Communication • Societal Issue.
Since my professional experience entirely based on IT, I was aware about some of the topics mentioned in essential ICT knowledge section before starting my professional career and then introduced to all of these when my career started and continued further. Below are details for required number of subtopics.

Professional Expectation

My 1st employer was an ISP and providing IT solutions as well. Initially I was responsible for desktop level support and later shifted to deployment team who was interacting with customer during project implementation period. This was the real time when I really learnt about professionalism and professional expectation. Sooner I realised the importance of fulfilling professional expectation and filled the gaps by completed Microsoft Certified System Engineer (MCSE) and Cisco Certified Network Associate (CCNA) trainings in 2006 and later in 2007 I managed to complete my CCNA certification. Trainings and certification really helped to meet professional expectations regardless from customer or employer and I managed to shine my experience in responsibility when further pursued my career.

I learnt the basics of professionalism when I was graduated in computer science in 2003. The study was about; Ethics, competency, education and responsibility or to have appropriate expertise to take care of people´s enduring concerns. The day since I started my professional carrier I've been adhering professionalism, as I have already explained the ICT Ethics in above paragraphs. Therefore, to fulfil the professional expectation I got Microsoft Certified System Engineer certification in 2008 and then got Master in Computer Sciences academic degree in 2009. I shined my experience in responsibility when I started my first job with Reveira Computers –UAE in 2003 where I had to take decisions in preparing project feasibility and then purchasing ICT active/passive equipment and had to show transparency and ownership of the decisions.

Teamwork Concept and Issues

I got experience on teamwork and addressing the teamwork issues while handling some new project as well as managing 24x7 ICT services too. I was leading the team of 02 and some outsourced contractors when I was in USEA. I divided my department into two categories; network and system division. I assigned level-1 responsibilities which included; regular health check of the servers (Domain controller, DHCP, DNS, FTP) in addition to that management of Microsoft windows 2008 based Active directory, Security Software - Symantec Endpoint Protection, Patch/updates management to one of my team member.
Likewise, Network division was assigned to 2nd team member to take care of Network which includes; routers, switches, modems, VPN gateways, firewall and passive network infrastructure. Whereas, 2-3 level issues was handled by myself for instance; configuration of new equipment, addition or replacement of the equipment, new project feasibility preparation, and site surveys.
I involved my team in several brainstorming session to get their valuable feedback and made the consensus of day to day issues.
I used to arrange daily and weekly meetings with my team to discuss the overall project status, challenges and finding out the possible solutions. Additionally, I recommended some vendor specific trainings/ certifications to my team to upgrade their ICT knowledge. Similarly, I also upgraded my academic and professional knowledge by taking Master degree in Computer science in 2009.
I definitely encountered some issues while working with my team for instance; pay raise, overtime allowances and leave issue which after a discussion I managed to resolve them.

Communication

While working with USEA, I initiated several new projects; to be specific, during the implementation of ERP (Enterprise Resource Planning) –Microsoft Dynamic Great Plan; I exceled myself in oral and writing communication as well as conducting meetings and giving presentation on ongoing project progress and about department's activities.
I had to schedule meetings with department heads to jot down their department's core requirements.

Similarly, finalizing the internal requirements, co-ordination with external contractors to give them association's business requirements, selection of best-fit product in the light of business requirement were my key roles. Addition to that I also learnt interpersonal skill, because during the project, the presentations continued for hours and without interpersonal skill it wasn't possible to deal with the people.

Societal Issue

I was actually involved in learning and then aggressively addressing societal issues when I was working with USEA. USEA is indirectly associated with U.S Government and needless to say I had access to highly sensitive data of U.S officials. As ICT is everywhere in these days; corporate email is configured on cell phones, tabs and great chances are to misuse the confidential information. At the same time a huge responsibility was on my shoulders to protect the association sensitive data. I managed to secure the data by applying appropriate security on database servers, firewall, and internet gateways making sure that individual's privacy and liberty rights are not being violated. Furthermore, I educated the computer users to strictly adhere the IT Policy by conducting workshops to minimize the chance of hacking/cracking or similar computer crimes from both side; internally or externally.

General ICT Area of Knowledge:

Technology Resources

a. Hardware and Software Fundamentals
b. Data and Information Management
c. Data Communications and Networking

How have you acquired this knowledge in your working environment? Illustrate your depth of knowledge.

Hardware and Software Fundamentals

I acquired knowledge in Hardware and Software Fundamentals during my academic study as well as from my work environment. My formal professional carrier starts from 2003 where I was working Reveira Computers-UAE. I was responsible of handling computer hardware, software and peripherals.

Hardware: All kind of computer hardware activities were in my domain for instance; troubleshooting and repairing of branded system (DELL, HP, ACER, MAC) Assembling of non-branded systems; up/down gradation by adding/replacing Microprocessors (Intel Pentium and AMD), Motherboards (Intel, Asus, MSI) RAM, Hard disk, Graphic cards, Power supplies, Network Controllers and I/O devices. I polished my technical knowledge further by working on BIOS/Firmware, configuring RAID controllers to implement failover and redundancy.
Software: Software is essential to operate hardware therefore I got experience of latest operating system (Microsoft windows 98/NT4/2000/xp) and also in security software; MacAfee, Norton, AVG and so. Application software; Microsoft office –word, excel, PowerPoint, outlook, access. To provide cost effective solution I upgraded my experience in Linux/Unix operating system. Later I got MSCE Certification and RHCE (Redhat Certified Engineer) to give extra edge to my professional knowledge.

Data and Information Management

During my professional commitment with United State Employee Association, I got expertise in handling database as the association was using oracle 8i database to manage its warehouses, inventory, point-of-sale systems and its regional offices. I had to manipulate database to generate several different weekly and monthly reports. Additionally, troubleshooting of database, normalization and security assurance was also under my domain. However, to meet the innovation and latest trend I replaced the existing database in 2009 with the latest off-the-shelf ERP system named Microsoft Dynamics Great Plan.

Data Communications and Networking

One of my favourite subjects was in my collage time during the study of Diploma of Associate Engineer-1995, then in Bachelor of Computer Sciences-2002 and later in Master of Computer Science-2008. Furthermore, I got Microsoft Certified System Engineer –MCSE 2003 certification and also Training of Cisco Certified Network Associate-CCNA along with Juniper Certification JNCIA. I have great knowledge in the field of Data Communication and Networks starting from 2001 during my study to-date by successful implementation of dozens of projects nationally and internally.

SECTION 2 - RPL PROJECT REPORTS

A project report is a coherent written description of a project or engagement that provides you with the opportunity to show how you perform as an ICT Professional. Each report is to relate to a significant project or work episode undertaken by you during your professional career.

The purpose of these reports is to enable you to demonstrate your command and implementation of the Areas of Knowledge described in Section 1 of this application.

Please note: You are required to provide two project reports.

Of the two reports, one must pertain to a project undertaken within the last three years, and the other for a project within the last five years.

Projects over two years long may be used for both reports under either of the following conditions:

- **The project has clearly-defined work efforts which took place in parallel, each with their own solution development and design activities and their own deliverables.**
- **The project had clearly-defined phases that were executed in succession, each with its own solution development and design activities and deliverables. Note that a second project phase that constructs and implements the solution developed by the first phase does not meet this requirement.**

Depending on the nature of your role in each project, the Project Report should cover an appropriate selection of factors. Appropriate factors will be determined based on the type of ICT project selected. Possible factors include:

- System Analysis and Design and Software Engineering methodologies used;
- Contribution to the processes involved in the design and implementation of enterprise-wide computing systems;
- Programming languages, design paradigms and implementation procedures adopted;
- Database and/or file design and management techniques employed;
- Network topologies, including size, distribution and security facilities installed;
- Project Management and quality assurance techniques followed;
- Internet application design, including database interactivity and security measures implemented;
- ICT managerial activities, demonstrating the nature and extent of responsibilities

Project Summary:			
	Project Name	**Start Date**	**End Date**
Project 1	**Microsoft Dynamic GP ERP Implementation + Infrastructure development**	**07/2011**	**09/2012**
Project 2	**Server Virtualization**	**03/2014**	**10/2014**

Instructions

The following pages provide a template for your reports.

When writing your reports please provide your own thoughts – do not just copy project documentation.

Please use the first person in your discussion, so it is clear to the assessor what you did versus what others did – say "I did X" rather than "X was done".

Diagrams from the project documentation may be helpful, but the text should be in your own words. Please ensure that diagrams are relevant, readable, and help the assessor to understand what you did as a member of the project team.

If sections of the Project Report template (see below) are not relevant to your participation in the project, then leave the section blank.

Focus on quality rather than quantity. **Each Project Report should be no more than four or five pages in length.**

SPECIAL NOTE:

By submitting this RPL Knowledge and Project Report form as a component of your ACS skills assessment application, you agree with the following statement:

The applicant confirms that the explanation of their knowledge and project reports submitted in this application truthfully and accurately describe the applicant and the applicant's personal involvement in the projects. The applicant is aware that plagiarism by the applicant will automatically invalidate this application, will jeopardise any future applications from the applicant and will be reported by the Australian Computer Society to the Australian Department of Immigration and Border Protection.

Project 1: Microsoft Dynamic GP ERP Implementation + Infrastructure development

1. Project Summary

1.1. Identification

Client's Company Name		
Business Address		
Contact Numbers		
Web Address		
Email Address		
Nature of project		
Location of project		
Name of your employer		

1.2. Duration

	From	To
Total project duration	07/2011	09/2012
Your involvement	07/2011	06/2012

1.3. Resources

	Number
Your team size	3
Total project team size	12

1.4. Personal Involvement

Please list the phases of the project in which you were personally involved

Start	Completion	Phase Description
07/2011	09/2011	**Phase 1: Requirement Gathering and ERP Product Selection** The scope of the project was to implement an ERP (Enterprises Resource Planning) system covering the requirement of Finance, Payroll, Warehouse department connecting 07 POS (point-of-sale) from remote offices based in Lahore, Karachi and Peshawar city to the Head Office located in Islamabad. In first phase of the project, I conducted detailed meetings with the department heads to understand the core requirement of their departments. After compiling the requirement, I thoroughly studied the features of available off-the-shelf products in the market for instance; Oracle E-Business Suit, SAP, Microsoft Dynamics Great Plan. I invited top ranking ERP implementers on the agenda of product demonstration taking all stakeholders on-board to evaluate the product features. After thorough discussion with stakeholders I got positive feedback about Microsoft Dynamics GP since the product was very close to USEA requirement and has all the features which USEA was looking for. After building consensus on MS-Dynamic GP, I raised the RFP (Request of Proposals) to different Microsoft ERP partners to get price comparison and also to meet the USEA procurement policy. In parallel, I had to evaluate the technology part, Hardware requirements, Security analyses, building infrastructure to connect remote sites over the Site-to-Site VPN. Let me share with you the existing setup of the USEA before this project. There were only 02 servers, running NT4.0 operating systems on them. One of them was a domain controller and other was a database server. 02 separate databases were being used; Oracle and FoxPro FoxPro based database was handling Finance and HR module where Oracle 8i based database was covering the Point-of-sale and warehouse. Both databases were running isolated and manual entries used to adjust the database.

Start	Completion	Phase Description
09/2011	11/2011	**Phase2: Hardware and Network feasibility Report** Being a Microsoft Certified System Engineer, my specialization is System and Network design. I received hardware and network recommendation from the ERP implementer to design the network infrastructure. I then prepared a project feasibility report, the bullet points are as given below. • Prepared a Logical network diagram to show network design by using Microsoft visio. • Live IP pool suggested from ISP to configure VPN server. • Up-gradation of Internet bandwidth of all remote sites. • Latest Server Hardware suggested (06 Servers ,Dell PowerEdge715 Rack mount) • Server cabinet (42 U with console) • NAS (Network Area Storage) for data backup. • 25 Dell PowerEdge workstations for end users. • Dell Dual Backup Tap drive suggested for off-site data backup. • APC 5000 UPS for power backup. • Optical Fibre Cable up-links between 03 on-premises sites following star topology. • Cisco Ethernet Gigabit Switches 2960G, 01 at each site. • UTP cat 6 cable used to provide Ethernet link from Cisco switches to the workstations. • Cisco GLC-SX-MM 60/125um module suggested to provide fibre uplinks. • Microsoft Windows 2008R2x64 operating system • Microsoft Office 2007 Professional. • IBM Point-of-Sale machine Surepos with thermal printer, touch screen and bar code reader suggested to use as POS. I forwarded BoQ (Bill of Quantity) to potential suppliers for financial proposal.
12/2011	12/2011	**Phase3: Budget Approval** I requested a budget approval meeting taking; IMO (Information Management Officer) USEA Board Member, General Manager and Finance Manager on board to brief them on; overall project progress, financial aspects (upfront + reoccurring cost), pros & cons and maintenance of the project. *After getting consent two POs (Purchase Order) were released by the procurement department; 1- To ERP contractor 2- To computer Hardware Supplier.*

Start	Completion	Phase Description
01/2012	04/2012	**Phase4: Hardware Installation & Network Infrastructure Building** My core responsibility was to provide the Servers and Network Infrastructure within 30 days so that ERP team could start installation of MS-Dynamics and Retail Management System on them. The Initial setup; installation of 42 U server cabinet and mounting of Dell server into the cabinet were done by my junior team however all the configuration part done by myself the detail is as given below: **System Setup** RAID-5 implemented on hardware level to provide disks level redundancy. Installation of Microsoft Windows 2008 R2 64bit operating system on all 6 Dell servers. Installation of Symantec Endpoint Protection server. Installation of Active Directory on new domain controller with clustering service to provide redundancy. Creation of OUs (organisational Unit) and configuration of user policies. Creation of network users and assignment of home directory with roaming profile. **VPN Setup** Installed RRAS (Routing and Remote Access Service) by configuring L2TP/IPsec (Layer-2 tunnelling protocol /Internet Protocol Security) to authenticate and authorize VPN (Virtual Private Network) requests from remote sites. **Network Setup** Configured Cisco 2960G switches by creating VLANs and Access Lists. DHCP (Dynamic Host Configuration Protocol) service configured on core cisco switch to assigned dynamic IPs to workstations. Configured gigabit fiber uplinks from core Cisco switch to the access layer Cisco Switches. Cisco ASA-500 firewall configured to protect the network against unauthorized access and DoS (Denial of Service) attacks. **Data Backup Setup** Configured Seagate NAS (Network Area Storage) and transfer all the network shares from previous server to the NAS. Configured automated schedule backup job to perform data backup on daily, weekly and monthly basis. Dell Tap Drive configured in way to copy weekly and monthly backup automatically on the taps. **VPN Client Site** Configured VPN client connection on remote sites Lahore, Peshawar and Karachi offices. **Network Monitoring** Network Monitoring tool (PRTG) installed and configured to monitor network and internet bandwidth utilization of local and remote data links from the head office to the remote sites.

Start	Completion	Phase Description
04/2012	06/2012	**Phase5: Network Testing** In last phase of the project, I verified network links by using cisco network utility. After getting desired results (The average network response time from each remote sites was 120 milliseconds) I then declared the system is ready to install ERP
06/2012	08/2012	**Phase6: ERP Installation**
08/2012	04/2012	**Phase7: Go-Live**

1.5. Describe your role(s) and responsibilities in the project.

I was leading the project starting from Phase1 till Phase5 which includes; selection of ERP, project budget approval, network designing, and coordination with vendors to finalize hardware specs and procurement, co-ordination with the Internet service provider for bandwidth increase and live IP pool management. However Phase6 and Phase7 dependent on ERP Installation team.

2. Business Opportunity or Problem

2.1. Describe the business opportunity or problem(s) this project addressed.

[The business got a central database linked all remote sites to it, where the users could generate real-time reports without doing any manual work. Furthermore, the internal network bandwidth was increased due to placement of Cisco gigabit switches. Additionally users were able to exchange large data files between remote offices since the site-to-site vpn was established.]

3. Solution

3.1. Discuss your contribution to the solution, project or engagement.

[My contribution was in both areas of the solution; project and engagement. In Phase-2,4 and 5 of the project where my core technical skill was utilized however in Phase1,3 project management was involved.]

3.2. Describe any design or problem solving methods you used on this project.

[After implementation of site-to-site VPN, the database synchronization from remote sites to central database was occurring every after few minutes which incredibly increase the overall productivity and helped users to generate different real-time report from the central database.]

3.3. List the major deliverables of the project that you were responsible for or contributed to.

- Recommendation of Hardware and Network Designing.
- Preparation of Logical/block diagrams.
- Installation and Configuration of network services and monitoring tools.
- Implementation of server and service level redundancy.
- Implementation of failover backup system.
- Configuration of Cisco switches and firewall.
- Network testing.

4. Results

4.1. Was your solution implemented? If so, describe the role, if any, you had in the implementation.

Yes, the solution was implemented successfully. All the installation and configuration part of the equipment and final testing were under my domain.

4.2. *Assess the overall success or failure of the project*.

Overall, the project was implemented successfully. The management was very delighted on this major upgrade. Users were happy with well-tuned and optimised network and database performance. I got appreciation letter by the General Manager of the United State Employee Association.

4.3. Lessons Learned

In retrospect, what you might have done differently on this project?

Everything went well, however I was little behind the deadline to deliver the solution. It was due to security reasons. My office was located in the compound of the U.S Embassy. I had to invite suppliers and contractors on the discussions but there was a long procedure involved to get access clearance of the visitors to get inside, which caused the project delay.

Project 2: Server Virtualization

5. Project Summary

5.1. Identification

Client's Company Name		
Business Address		
Contact Numbers		
Web Address		
Email Address		
Nature of project		
Location of project		
Name of your employer		

5.2. Duration

	From	To
Total project duration	03/2014	10/2014
Your involvement	03/2014	10/2014

5.3. Resources

	Number
Your team size	3
Total project team size	3

5.4. Personal Involvement

Please list the phases of the project in which you were personally involved

<table>
<tr><th>Start</th><th>Completion</th><th>Phase Description</th></tr>
<tr><td>03/2014</td><td>05/2014</td><td>
Phase 1: The Assessment phase
Al-Jawaher Reception & Convention Centre selected an ERP system “Microsoft Dynamics Axapta” for its business automation, on the bases of ERP hardware recommendation received by Microsoft solution partner I had to provide a reliable server hardware setup along with failover and backup system.
I did a thorough research on the available hardware to provide a robust, efficient and a reliable platform for ERP installation.

There were 03 major categories available.

• Physical Server based solution
• Blade Servers
• Virtualization.

After intensive research I finally decided to go with virtualization due to its cost effectiveness, high-availability, mobility, security and excellent disaster recovery over physical and Blade server solutions.
As per requirement, I had to provide 06 servers as given below:

<table>
<tr><th>Server Role</th><th>No. of Server</th><th>Failover/ Redundancy</th><th>Total</th></tr>
<tr><td>Database Server</td><td>01</td><td>01</td><td>02</td></tr>
<tr><td>Application Server</td><td>01</td><td>01</td><td>02</td></tr>
<tr><td>Test Application Server</td><td>01</td><td>-</td><td>01</td></tr>
<tr><td>Test Database Server</td><td>01</td><td>-</td><td>01</td></tr>
<tr><td colspan="3">Total No of Server Required</td><td>06</td></tr>
</table>

After selecting virtualization, I had to choose the best hypervisors between Microsoft Hyper-V and VMware.
Another research process involved comparing both hypervisors. I then finally gave preference to VMware over Hyper-V because Hyper-V was introduced by Microsoft few years before and it has certain limitation in terms of assigning virtual memory to the VMs, limited support of Linux based operating systems, only support of 16 host CPUs, and no support of NIC teaming. Whereas all above features were mandatory to establish an efficient platform for ERP system and were available in VMware.
</td></tr>
</table>

Start	Completion	Phase Description
06/2014	07/2014	**Phase 2: Solution Design + BoQ** In this phase I had to design a solution with VMware Esxi 5.5 providing following core features. Disk level Failover system. Server Level failover system. SAN Storage to keep Virtual Machines. Automated Backup System. Failover at Networking and Switching level. I used 02 HP ProLiant servers with identical hardware specifications. To provide Hard disk level failover, I implemented RAID 1 on each server. To store virtual machines, I decided to use HP SAN (Storage Area Network). For automatic backup of virtual machine and local data I used Veeam backup solution which is the most popular backup software recommended by VMware. To deal with networking level disaster I used Cisco 3600 series 48 port gigabit switches with creation of VLAN to keep the network traffic separate. After finalizing the network design I was able to prepare a BoQ (Bill of quantity), the complete items are as given below:- • 2x HP DL380p Gen 8, 2 x E5-2650 v2, 32GB. • 1x HP MSA 2040 SAN DC SFF Storage • 1x HP MSA 600GB 6G SAS 10K 2.5in DP ENT HDD • 1x HP LTO5 Ultrium 3000 SAS Int Tape Drive • 1x VMware vSphere 5 Essentials plus Kit for 3 hosts. • 1x Veeam Backup Essentials Enterprise

Start	Completion	Phase Description
09/2014	09/2014	**Phase 3: Installation & Configuration** In this phase of the project I performed installation and configuration, the steps are as given below: • I configured RAID-1 on both severs (Host1 and Host2) by using 300GB SAS Hard disks. In total 04 HDD were used, 02 on each server as per RAID-1 requirement. • VMware vSphere Hypervisor 5 (ESXi) installed on Host1 by assigning IP address, host name and NIC selection. Following same steps I installed EXSI on Host2. *(In order to configuring both Hosts to deal with HA-High Availability, both servers should be identical in hardware specs and configuration)* • After installation of EXSI on both Hosts, I configured SAN (MSA2040SaN) 3.27TB Storage by assigning controller IP address on both controllers and hostname, configured network parameters, configured RAID on SAN storage and populated volumes. • SAN storage was mapped with both Hosts. • I installed VMware vCenter Server with HA feature which is an efficient way to manage virtual machines from single console, resource management and maintain higher availability. **Networking and Switching** It isn't possible to get optimised and high performance from virtualization setup until the network and switching part is not properly configured. I performed following steps to configure network and switching part. • 02 VLAN were created on 3750G 48 ports Cisco layer-2 switch; Management VLAN and VMNetwork VLAN. • 05 NIC ports from Host1, 05 NIC ports from Host2 connected to Management VLAN. • 03 NIC ports from Host1 and Host2 connected to VMNetwork VLAN to provide network failover. **Virtual Machine Configuration** Before going into testing phase I had to create server virtual machines as per specification recommended by Microsoft Dynamics AX • Database Server: The Database virtual machine was created by; 8 virtual processors, 32 GB of RAM, HDD storage-MSA2040SAN. • Application Server: 08 virtual processors, 32 GB of RAM, HDD storage-MSA2040SAN. • Test-Database Server: 06 virtual processors, 16 GB of RAM, HDD storage-MSA2040SAN. • Test- Application Server: 06virtual processors, 16 GB of RAM, HDD storage-MSA2040SAN. **Veeam Backup Solution** I installed Veeam backup & Replication 7.0 and attached tap drive with Veeam and configured daily, weekly and monthly data backup.

Start	Completion	Phase Description
09/2014	10/2014	**Phase 4: Testing** In this final phase of the project I had to perform several performance tests to verify the features. **Network Performance and Failover Test.** By using ping utility I verified the network performance by from one virtual machine to other and from external network to the virtual machines. The response time was less than 10millisend which showed the network links are highly optimised. I then unplug the network cables of Host1-NIC#1, however network traffic automatically switched through NIC#2. Similarly Host2 was testing by unplugging the network cables to verify the redundancy. **RAID1 Hard disk Level Test** I verified the RAID-1 configuration by removing one hard disk from Host1 while Host1 was ON and running. Similarly, Host2 was tested. **HA (High Availability) / Server Failover Test** I verified the HA (High Availability) by turning off Host1 completely, however, as per configuration, Host2 automatically took control of virtual machines by checking the heartbeat of Host1. Similarly, Host1 was tested where I concluded by test result that HA is fully functioning. **Automated Backup Test** After taking complete backup of a virtual machine, I then restore the VMs from backup source which took approximately 4-7 minutes to restore the contents. After performing all the tests I declared the server setup is ready for the ERP installation.

5.5. Describe your role(s) and responsibilities in the project.

I was leading the project from phase 1 all the way until testing which includes; selection of the hypervisors, designing and configuration and testing. My team was assisting in this project in mounting hardware into data cabinet, pulling network cables and installation of Ms windows operating systems on virtual machines.

6. Business Opportunity or Problem

6.1. Describe the business opportunity or problem(s) this project addressed.

Firstly, JRCC got a latest solution with HA (High Availability) assuring up-time by 99.9%. Secondly, the solution was cost effective, as compare to physical servers the cost was 40% less. Thirdly, by implementing of Vaeem backup, taking backups and restoring them on original places within only few minutes was icing on the cake.

7. Solution

7.1. Discuss your contribution to the solution, project or engagement.

I was the key player of the project where I selected most appropriate solution keeping eye on the current requirement as well leaving space for future up-grade. Furthermore, logical/block diagrams, Hardware selection and final system testing was done by me. In addition to that, I was also engaged in several meeting with the management to convince them on the solution and getting budget approval.

7.2. Describe any design or problem solving methods you used on this project.

It was essential to have a SAN switch to provide network failover, however, the cost of SAN switch was very high. Therefore, as an alternate solution I used Cisco Layer2 switch and created VLAN to get almost same functionally.

7.3. List the major deliverables of the project that you were responsible for or contributed to.

I was responsible of the following deliverables.

- Hypervisors selection,
- System designing.
- Preparation of technical-cum-financial proposal
- Implementation of HA, failover/redundancy
- Testing

8. Results

8.1. Was your solution implemented? If so, describe the role, if any, you had in the implementation.

The project was completed successfully. During the implementation I was fully involved in configuring network switches, VMware configuration, physical servers configuration, High Availability implementation and finally in testing the whole solution.

8.2. *Assess the overall success or failure of the project*.

Overall, I would say the project was highly successful. I got all the result that I had planned in designing part however I also fulfilled infrastructural and system requirement received by Microsoft for Microsoft Dynamics Ax installation.

8.3. Lessons Learned

In retrospect, what you might have done differently on this project?

The SAN switch was very helpful in terms of network failover but due to budget constraint I had to go for alternate solution. I then used cisco layer-2 switch, and by creating VLANs the same result was achieved but with cost effective solution.