

**Project Title: iKnow e-Student Services**

**Reference: LSBU Ref: 10/021/FoB**

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# **Hardware and software requirements specification for expected performance**

**Jun 2011**

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# ***1. HARDWARE AND SOFTWARE REQUIREMENTS***

## ***SPECIFICATION FOR EXPECTED PERFORMANCE***

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### ***1.1 PROPOSED INFRASTRUCTURE***

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#### **Database Servers, Application Servers and Web Servers: MS Windows 2008 Server Enterprise**

The proposed solution will run on the following operating system: MS Windows 2008 Server Enterprise edition for 64 bit or Standard edition for 64 bit, or substantially equivalent.

Server's operating system: Windows Server 2008 Standard or Enterprise Edition.  
Other used technologies:

- Database: MS SQL Server Standard Edition
- Microsoft ASP.NET
- Microsoft .NET Framework
- Microsoft Internet Information Services
- Microsoft .NET Enterprise Services/Component Services
- Microsoft Message Queuing Services
- Microsoft Certificate Services (PKI)
- Microsoft Network Load Balancing
- Microsoft Clustering Services
- XML, SOAP, WSE
- WWF – Windows Workflow Foundation
- WCF – Windows Communication Framework
- AJAX

Figure 1 Simple Architecture

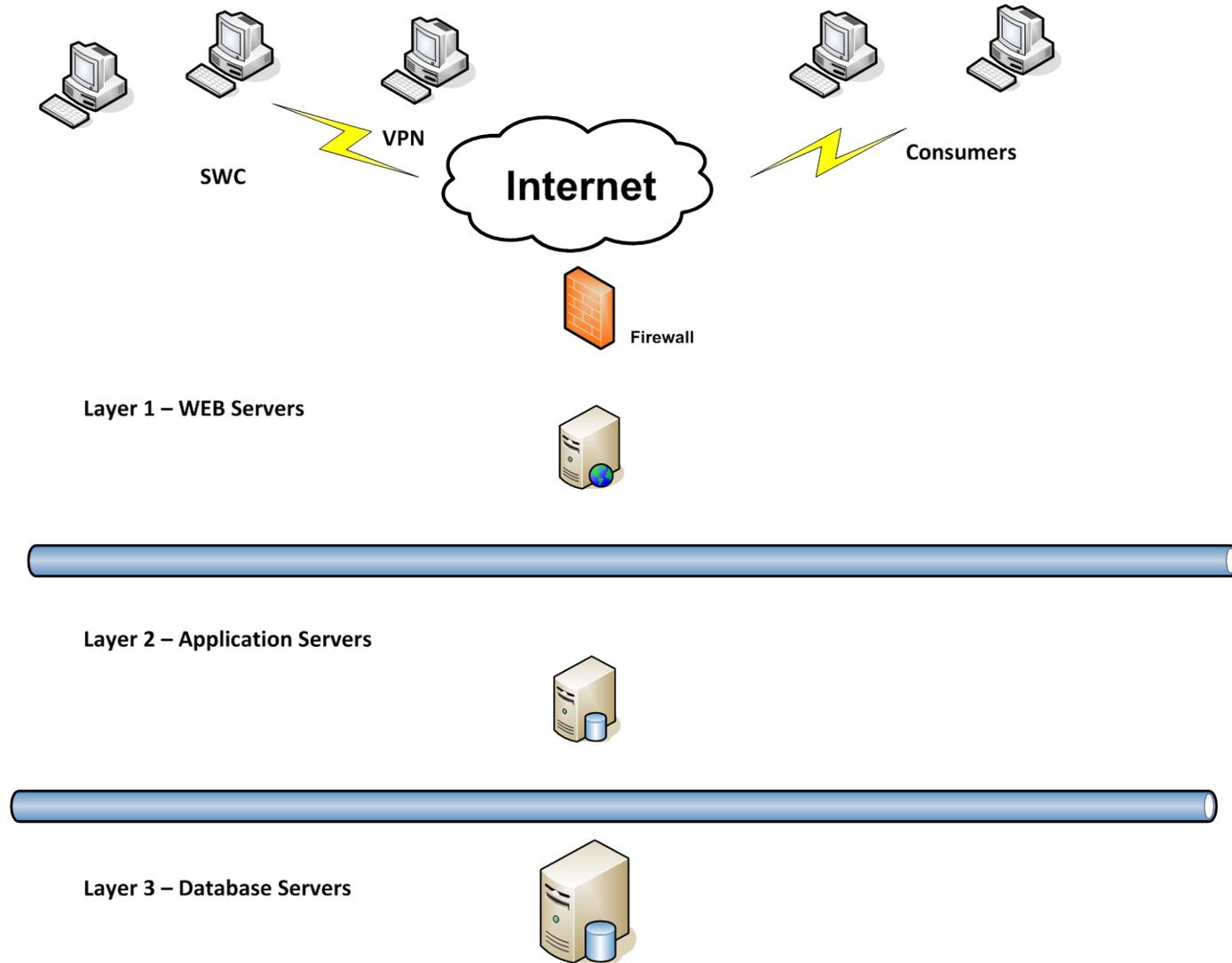
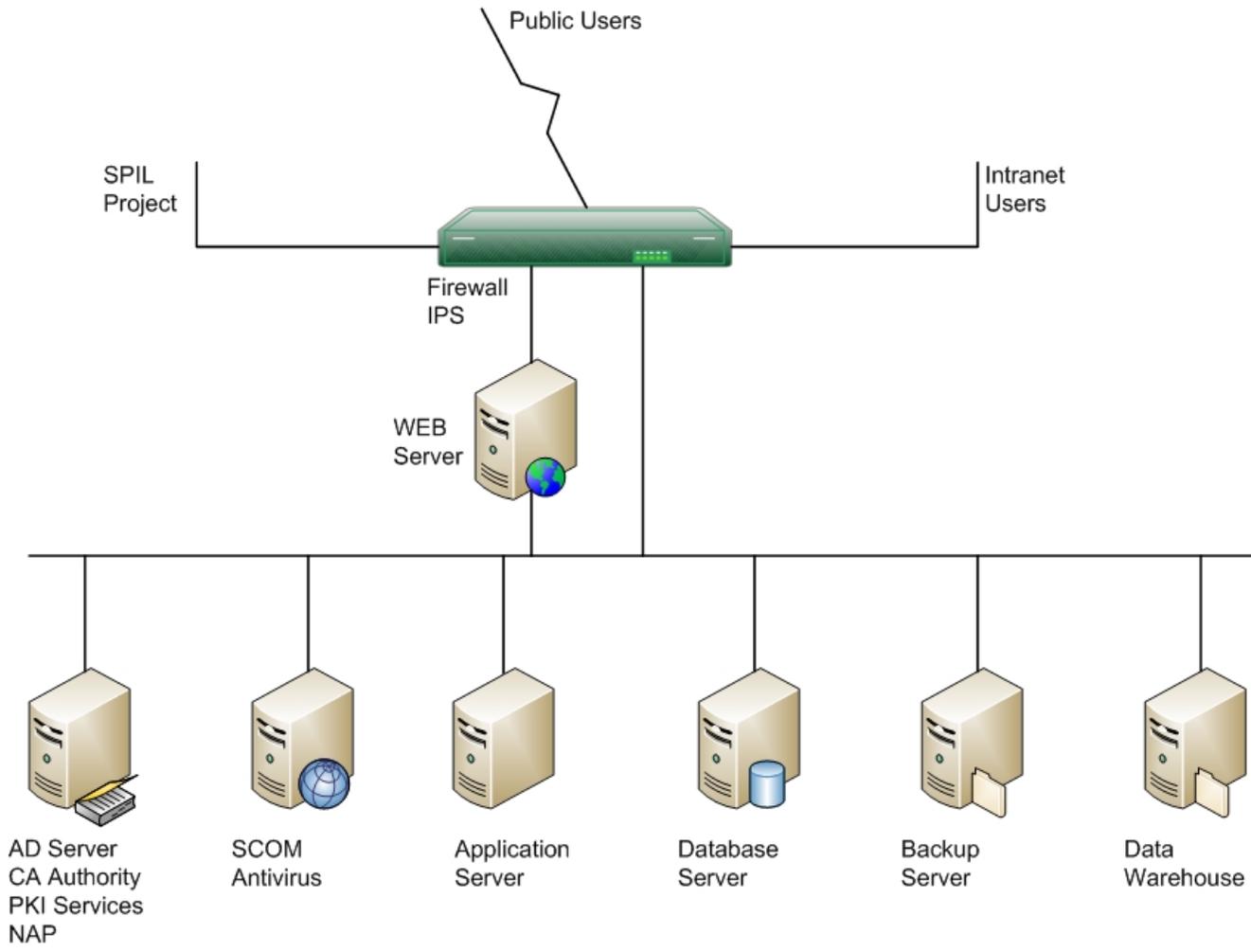


Figure 2 Proposed Architecture



## ***1.2 HARDWARE REQUIREMENTS FOR THE PROPOSED SOFTWARE SOLUTION***

Hardware recommendation is based on a new proven technology which consists of 2 servers as a platform for virtualization. The hardware is a simple cost effective server consolidation solution consisting of 2 HP DL370 G7 or newer servers with license for HP LeftHand Storage and VMware virtualization. The LeftHand Storage enables local disk to be virtualized in a SAN environment without the need of external storage. This solution enables cost effective SAN storage with full functionalities while reducing the prices over conventional storage. On top of the storage is the VMware Hypervisor, the first cloud operating systems enabling High availability on the Virtual Machines. The HP Virtualization bundles are the world's first end-to-end solution that delivers application high availability without external storage. Many small and mid-sized organizations are using server virtualization to achieve cost reductions by up to 52% – by reducing the number of servers or to provide cost-effective high availability failover. To take advantage of some of the most critical features in VMware vSphere (HA, VMotion, SRM) customers need to implement highly available storage area networks (SAN). For many mid-sized customers this is a challenge: adding external storage increases their hardware costs and impacts overall IT management. The HP Virtualization bundles allow an organization to pool all of the storage that is either inside a ProLiant G7 server or directly attached to it, into one virtualized pool of storage. Combined with HP ProCurve data center networking solutions, this allows an organization to quickly implement a fully virtual infrastructure, with all of its benefits, using pre-tested building blocks.

Key Benefits:

### **Reduced costs**

- A complete solution for virtualization at reduced cost. Simple and predictable standard building blocks of infrastructure means you can scale your environment when needed
- Virtual server high availability without external storage reduces storage costs
- Reduced risk, complexity, and time required for server virtualization projects
- Managed LAN solutions back by HP ProCurve industry leading lifetime warranty

### **Improve application high availability and business continuance**

- Current approaches to providing this are complex and expensive so have not been implemented in many organizations
- Applications and storage stay online during site failures
- VMware vSphere provides application failover; the LeftHand VSA software provides storage failover
- Network resiliency by supporting redundant links

### **Deploy with Confidence**

- One contract, one contact: HP sells and supports all the hardware and software products so get one service contract and one HP contact
- Deploy with confidence: HP has tested each configuration to ensure the solution performs and works as expected
- Adaptive networking in support of virtualization provides flexibility through standards-based solutions that adapt to meet the changing needs of users, applications and organizational objectives.

**Virtualization:**



Figure 3 Virtualization

Designed especially for small IT environments with fewer than 20 physical servers, the VMware vSphere Essentials Editions deliver enterprise-class capabilities in a cost-effective solution package for organizations that want to optimize and protect their IT assets with minimal up-front investment.

VMware vSphere Essentials Plus adds high application availability and data protection for a complete server consolidation and business continuity solution for the small office IT environment.

VMware vSphere is the next evolutionary step in IT computing; enabling customers to bring the power of cloud computing to their IT infrastructures. Building on the power of VMware® Infrastructure, VMware vSphere dramatically reduces capital and operating costs, and increases control over IT infrastructures while preserving the flexibility to choose any OS, application and hardware.

Build on a proven virtualization platform to provide the foundation for internal and external clouds, using federation and standards to bridge cloud infrastructures—creating a secure private cloud. Organizations of all sizes can achieve the full benefits of cloud computing, delivering the highest levels of application service agreements with the lowest total cost per application workload.

**Key Features:**

**High-Performance Server Virtualization**

- Record-breaking performance for resource-intensive workloads

- Ability to configure virtual machines with up to 4 virtual CPUs each
- Advanced virtual machine memory management capabilities
- Support for 64-bit server hardware with up to 512GB of physical RAM

### Integrated High Availability and Data Protection

- Hardware-independent virtual machine failover with [VMware HA](#)
- NIC teaming and HBA multipathing to protect against hardware failures
- Efficient, integrated backup with [VMware Data Recovery](#)
- Support for all major third-party backup solutions

### Centralized Management Capabilities

- Rapid wizard-based provisioning and virtual machine templates
- Automated patch management with [VMware vCenter Update Manager](#)
- Operational automation with task scheduling and alerts
- Integrated physical-to-virtual machine conversion capabilities

### Security and Control

- Integrated network security and firewall protection for virtual machines
- [VMware VMsafe](#)™ security APIs for third-party security products
- Role-based access control and integration with Microsoft Active Directory
- SSL encryption for secure remote access to [VMware ESX and ESXi hosts](#)

### Broad Hardware and Software Interoperability

- Compatibility with the widest range of server hardware in the industry
- Certified integration with Dell, Fujitsu Siemens, HP, IBM, NEC, and Sun servers
- Certified support for SATA, NAS, iSCSI and Fibre Channel storage equipment
- Support for broadest range of 32- and 64-bit x86 server operating systems
- Ability to run any standard software application without modification

Vitalizing the storage and the systems gives us the ability to fully utilize the powerful underlying hardware while reducing the costs of licenses for the operating systems, high availability and management. With the new Microsoft policies for licensing under virtualized environment the purchaser is entitled for 4 virtual machines and 1 physical machine with one license for Server Enterprise version and 1 virtual machines and 1 physical machine for Server Standard version of the operating systems. Also for the SQL server license the purchaser pays only how many CPUs or virtual CPUs will use. The backup solution if it is not used (sleeping) are not spending licenses.

### High Availability:

The High availability for our solution is done by the VMware's Hypervisors which lower the costs for enterprise version for the operating systems and the clustered products. With the help of vMotion and the support for this function on CPU level the system transparently moves the virtual machines from the failed hardware without any impact on the customers.

Since the solution is fully high available with redundant servers, power supplies, network cards we are proposing the following scenario for backing up. All the servers will have a daily scheduled snapshot ensuring quick recovery from operating failures. The snapshots will be kept a considerable period of time which after will be removed. As a backup for the database server a daily downtime frame will be scheduled from 4AM to 5AM that will provide a simple copy of the virtual machine that will provide quick recovery from different failures.

**Security:**

The entire solution is secured by UTM firewall. The firewall is from Checkpoint enabling not only firewall features but proactive scanning, intrusion prevention services, antivirus and antimalware services and vulnerability assessment with its unique SmartDefences services. The UTM firewall will secure proactively the entire solution by scanning the entire traffic to the system. The solution is designed to work with virtual LANs (VLAN) ensuring granular security that will be routed from the firewall. With this we will provide separation between the different networks and ensuring that no harmful action can be taken to the system. Also as addition the security Network Access Protection (NAP) will be implemented ensuring that no other hosts can be added to the system without prior approval from the IT management staff.

**Management:**

As addition to the system we are providing integrated Lights-Out services from HP enabling full remote management of the servers over LAN without the need of actual being in front of the system using KVM, keyboards, monitors. Also the management of the virtual machines are done remotely with client software enabling full configuration of the virtual machines.



Technical Bid

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***1.3 HARDWARE - HP VIRTUALIZATION SMART BUNDLES***

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