

HDSE/BDSE - IT Systems & Networks

Project Planning

Project Scenario

You are a Junior Network Administrator at Swift & Bacon Publishers (SBP) Ltd, a medium sized company that deals with the publication of books and journals for the scientific and technical community. Books are published both as physical and electronic copies.

SBP Ltd is currently situated in two office buildings and contains four Publishing Teams that deal with subject-specific material: a team for Computer Science and Engineering, a team for Maths and Physics, a team for Biological and Chemical sciences and a team for the Biomedical Sciences.

Each Publishing Team has a Publishing Team Leader (PTL), and up to 20 Publishing Editors (PE). Each team has their own secured area on the network. Each PE has access to their own content only, as well as any shared team documentation, but they do not have access to any other documentation.

The PTL can access all material for that team. There is an area for SBP company documentation that anyone can view.

SBP receives manuscripts securely from their authors into an encrypted Public Repository Server (PRS) located on the premises. The manuscripts are then extracted from this repository by one of the four PTLs, who then assigns the manuscript to the PE.

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All documentation and office software are located on a company file server.

Once a manuscript has been reviewed, it is uploaded to the Secure Publishing Server (SPS) where the content is either sent electronically to an external printing company or is available for download by paying customers.

SBP also maintains a team of three Network Administrators who have full admin access to the entire network.

There is also a Senior Publishing Manager and CEO who have access to all company documentation.

Since the 2020 pandemic, the company has realised that a hybrid working model is now most effective for their employees. SBP is planning to close one office building completely to allow staff to work from home if they choose.

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SBP wants to set up their remaining building in the following physical configuration.

- The PRS and SPS servers are in a data centre on the top floor
- The middle floor is a suite of five public meeting rooms with full wired and wireless access
- The Network Server Room containing the company network and email servers is on the middle floor
- The network administrators are also located on the middle floor
- One network administrator must be present in the building each day. The on-site network administrator uses a desktop machine for server administration
- The ground floor is to be a collection of 20 open-plan 'hot desks' where employees who choose to come into work can go to any desk, plug their laptop into the cabled network and begin working.

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To facilitate working from home the company wants the following.

- Each employee is to be issued with a company laptop
- The laptop will contain a software firewall, as well as VPN client
- Employees will store company data on the company file servers
- A high-throughput VPN server will need to be installed and configured to allow secure connectivity for all remote working employees
- The security model of all company data must be preserved
- All office software must be accessed using a cloud-based delivery model, e.g. Google Docs, Office 365
- Each employee is to be based in mainland UK.

SBP also wants to explore moving the company data located on the file server to a cloud-based offering such as SharePoint or Google Workspace, but they are also happy to maintain a file server within the data centre if necessary.

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The SBP network requirements are that:

- the data centre can handle high-volume traffic of data from inside and outside the organisation
- the ground and middle floors have a mixture of wired and wireless connectivity
- all Publishing Teams are isolated from each other
- there is proper consideration given to network security to minimise a data breach
- a firewall will need to be installed and configured to allow inbound and outbound traffic
- there is no lag of data traffic between floors and no connectivity 'dead spots'
- any data sent to a cloud server or stored on the RPS server is encrypted
- there are robust backup facilities in place for the SBP data in case of a data loss or security breach
- the current network security model for teams and employees is preserved even though employees are working from home.

The SBP CEO and Senior Network Administrator has asked you to design and build a virtual network solution that will fulfill the company requirements. This will help SBP to identify any potential issues in the requirements before spending money on closing a building and reorganising the remaining building layout and employee requirements.

In addition, SPB wants you to create a presentation for them, showing the range of available networking topologies, protocols, hardware and software, to demonstrate that you have the breadth of knowledge available to you before you begin the design task.

Project Activity 3

Document to be produced: Technical Report

Content:

You are required to implement a virtual networked solution for the requirements specified by SBP Ltd. You should make use of whichever virtual network simulator is most appropriate for your optimised network design and for the nature of the networked solution. You should produce your evidence as a technical report.

Your report should include:

- a critical reflection of the decisions made to enhance the network design and the implemented solution.
 - What are the area in networked system that has decided to proceed with enhancement?
 - How has the enhancement or the implemented solutions affect the networked system and the company? Provide evidence or screenshot of the enhancement and the impact (comparison between before and after enhancement)
- clear evidence for the implementation of the optimised design, for example screenshots, configuration files, annotated and verified demonstration evidence, network monitoring reports (*)
Include the screenshot from Cisco Packet Tracer.

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You are required to implement a virtual networked solution for the requirements specified by SBP Ltd. You should make use of whichever virtual network simulator is most appropriate for your optimised network design and for the nature of the networked solution. You should produce your evidence as a technical report.

Your report should include:

- a test plan implementation, using the test plan designed in Activity 2, clearly documenting the test results against the expected results (*)

Test Item	Test Action	Test Data	Expected Results	Actual Results with evidence
Topology	Test if the topology is up and running	Routing tables Ping test outputs	All networking devices are connected.	All networking devices are connected.
- an analysis of the results of the test plan and, based on this, recommendations of potential enhancements for the networked system. (*)

Identify potential enhancements for the networked system you designed in Activity 2. You may include assumptions.

For example: if higher budget is allocated for the team to redesign, what are the devices that could be further added or enhanced.

Thank you