**PPDIOO Lifecycle Approach to Network Design and Implementation**

PPDIOO stands for Prepare, Plan, Design, Implement, Operate, and Optimize. PPDIOO is a Cisco methodology that defines the continuous life-cycle of services required for a network.

**PPDIOO Phases**

The PPDIOO phases are as follows:

* **Prepare:** Involves establishing the organizational requirements, developing a network strategy, and proposing a high-level conceptual architecture identifying technologies that can best support the architecture. The prepare phase can establish a financial justification for network strategy by assessing the business case for the proposed architecture.
* **Plan:** Involves identifying initial network requirements based on goals, facilities, user needs, and so on. The plan phase involves characterizing sites and assessing any existing networks and performing a gap analysis to determine whether the existing system infrastructure, sites, and the operational environment can support the proposed system. A project plan is useful for helping manage the tasks, responsibilities, critical milestones, and resources required to implement changes to the network. The project plan should align with the scope, cost, and resource parameters established in the original business requirements.
* **Design:** The initial requirements that were derived in the planning phase drive the activities of the network design specialists. The network design specification is a comprehensive detailed design that meets current business and technical requirements, and incorporates specifications to support availability, reliability, security, scalability, and performance. The design specification is the basis for the implementation activities.
* **Implement:** The network is built or additional components are incorporated according to the design specifications, with the goal of integrating devices without disrupting the existing network or creating points of vulnerability.
* **Operate:** Operation is the final test of the appropriateness of the design. The operational phase involves maintaining network health through day-to-day operations, including maintaining high availability and reducing expenses. The fault detection, correction, and performance monitoring that occur in daily operations provide the initial data for the optimization phase.
* **Optimize:** Involves proactive management of the network. The goal of proactive management is to identify and resolve issues before they affect the organization. Reactive fault detection and correction (troubleshooting) is needed when proactive management cannot predict and mitigate failures. In the PPDIOO process, the optimization phase can prompt a network redesign if too many network problems and errors arise, if performance does not meet expectations, or if new applications are identified to support organizational and technical requirements.

**NOTE :**Although design is listed as one of the six PPDIOO phases, some design elements can be present in all the other phases. Moreover, use the six PPDIOO phases as a model or framework; it is not necessary to use it exclusively as defined.

**Benefits of a Lifecycle Approach**

The network lifecycle approach provides several key benefits aside from keeping the design process organized. The main documented reasons for applying a lifecycle approach to campus design are as follows:

* Lowering the total cost of network ownership
* Increasing network availability
* Improving business agility
* Speeding access to applications and services

The total cost of network ownership is especially important into today's business climate. Lower costs associated with IT expenses are being aggressively assessed by enterprise executives. Nevertheless, a proper network lifecycle approach aids in lowering costs by these actions:

* Identifying and validating technology requirements
* Planning for infrastructure changes and resource requirements
* Developing a sound network design aligned with technical requirements and business goals
* Accelerating successful implementation
* Improving the efficiency of your network and of the staff supporting it
* Reducing operating expenses by improving the efficiency of operational processes and tools

Network availability has always been a top priority of enterprises. However, network downtime can result in a loss of revenue. Examples of where downtime could cause loss of revenue is with network outages that prevent market trading during a surprise interest rate cut or the inability to process credit card transactions on black Friday, the shopping day following Thanksgiving. The network lifecycle improves high availability of networks by these actions:

* Assessing the network's security state and its capability to support the proposed design
* Specifying the correct set of hardware and software releases, and keeping them operational and current
* Producing a sound operations design and validating network operations
* Staging and testing the proposed system before deployment
* Improving staff skills
* Proactively monitoring the system and assessing availability trends and alerts
* Proactively identifying security breaches and defining remediation plans

Enterprises need to react quickly to changes in the economy. Enterprises that execute quickly gain competitive advantages over other businesses. Nevertheless, the network lifecycle gains business agility by the following actions:

* Establishing business requirements and technology strategies
* Readying sites to support the system that you want to implement
* Integrating technical requirements and business goals into a detailed design and demonstrating that the network is functioning as specified
* Expertly installing, configuring, and integrating system components
* Continually enhancing performance

Accessibility to network applications and services is critical to a productive environment. As such, the network lifecycle accelerates access to network applications and services by the following actions:

* Assessing and improving operational preparedness to support current and planned network technologies and services
* Improving service-delivery efficiency and effectiveness by increasing availability, resource capacity, and performance
* Improving the availability, reliability, and stability of the network and the applications running on it
* Managing and resolving problems affecting your system and keeping software applications current

**NOTE**

The content of this book focuses on the prepare phase, plan phase, and design phases of the PPDIOO process as applied to building an enterprise campus network.

**Planning a Network Implementation**

The more detailed the implementation plan documentation is, the more likely the implementation will be a success. Although complex implementation steps usually require the designer to carry out the implementation, other staff members can complete well-documented detailed implementation steps without the direct involvement of the designer. In practical terms, most large enterprise design engineers rarely perform the hands-on steps of deploying the new design. Instead, network operations or implementation engineers are often the persons deploying a new design based on an implementation plan.

Moreover, when implementing a design, you must consider the possibility of a failure, even after a successful pilot or prototype network test. You need a well-defined, but simple, process test at every step and a procedure to revert to the original setup in case there is a problem.

**NOTE**

It is best-practice to lay out implementation steps in a tabular form and review those steps with your peers

**Implementation Components**

Implementation of a network design consists of several phases (install hardware, configure systems, launch into production, and so on). Each phase consists of several steps, and each step should contain, but be not limited to, the following documentation:

* Description of the step
* Reference to design documents
* Detailed implementation guidelines
* Detailed roll-back guidelines in case of failure
* Estimated time needed for implementation

**Summary Implementation Plan**

Table 1-3 provides an example of an implementation plan for migrating users to new campus switches. Implementations can vary significantly between enterprises. The look and feel of your actual implementation plan can vary to meet the requirements of your organization.

**Table 1-3. Sample Summary Implementation Plan**

| **Phase** | **Date, Time** | **Description** | **Implementation Details** | **Completed** |
| --- | --- | --- | --- | --- |
| Phase 3 | 12/26/2010 1:00 a.m. EST | Installs new campus switches | Section 6.2.3 | Yes |
| Step 1 |  | Installs new modules in campus backbone to support new campus switches | Section 6.2.3.1 | Yes |
| Step 2 |  | Interconnects new campus switches to new modules in campus backbone | Section 6.2.3.2 | Yes |
| Step 3 |  | Verifies cabling | Section 6.2.3.3 |  |
| Step 4 |  | Verifies that interconnects have links on respective switches | Section 6.2.3.4 |  |
| Phase 4 | 12/27/2010 1:00 a.m. EST | Configures new campus switches and new modules in campus backbone | Section 6.2.4.1 |  |
| Step 1 |  | Loads standard configuration file into switches for network management, switch access, and so on | Section 6.2.4.2 |  |
| Step 2 |  | Configures Layer 3 interfaces for IP address and routing configuration on new modules in campus backbone | Section 6.2.4.3 |  |
| Step 3 |  | Configures Layer 3 interfaces for IP address and routing info on new campus switches | Section 6.2.4.4 |  |
| Step 4 |  | Configures Layer 2 features such as VLAN, STP, and QoS on new campus switches | Section 6.2.4.5 |  |
| Step 5 |  | Tests access layer ports on new campus switches by piloting access for a few enterprise applications | Section 6.2.4.6 |  |
| Phase 5 | 12/28/2010 1:00 a.m. EST | Production implementation | Section 6.2.5 |  |
| Step 1 |  | Migrate users to new campus switches | Section 6.2.5.1 |  |
| Step 2 |  | Verifies migrated workstations can access enterprise applications | Section 6.2.5.2 |  |

Each step for each phase in the implementation phase is described briefly, with references to the detailed implementation plan for further details. The detailed implementation plan section should describe the precise steps necessary to complete the phase.

**Detailed Implementation Plan**

A detailed implementation plan describes the exact steps necessary to complete the implementation phase. It is necessary to includes steps to verify and check the work of the engineers implementing the plan. The following list illustrates a sample network implementation plan:

Section 6.2.4.6, "Configure Layer 2 features such as VLAN, STP, and QoS on new campus switches"

* Number of switches involved: 8
* Refer to Section 1.1 for physical port mapping to VLAN
* Use configuration template from Section 4.2.3 for VLAN configuration
* Refer to Section 1.2 for physical port mapping to spanning-tree configuration
* Use configuration template from Section 4.2.4 for spanning-tree configuration
* Refer to Section 1.3 for physical port mapping to QoS configuration
* Use configuration template from Section 4.2.5 for QoS configuration
* Estimate configuration time to be 30 minutes per switch
* Verify configuration preferable by another engineer

This section highlighted the key concepts around PPDIOO. Although this topic is not a technical one, the best practices highlighted will go a long way with any network design and implementation plan. Poor plans will always yield poor results. Today's networks are too critical for business operations not to plan effectively. As such, reviewing and utilizing the Cisco Lifecycle will increase the likelihood of any network implementation.

*Assignment:*

1.Expand & Explain the different pases of PPDIOO

2.Discuss the benefits of PPDIOO

3.Explain the detailed implementation plan