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Identifying Design Requirements

Applying a Methodology to Network Design

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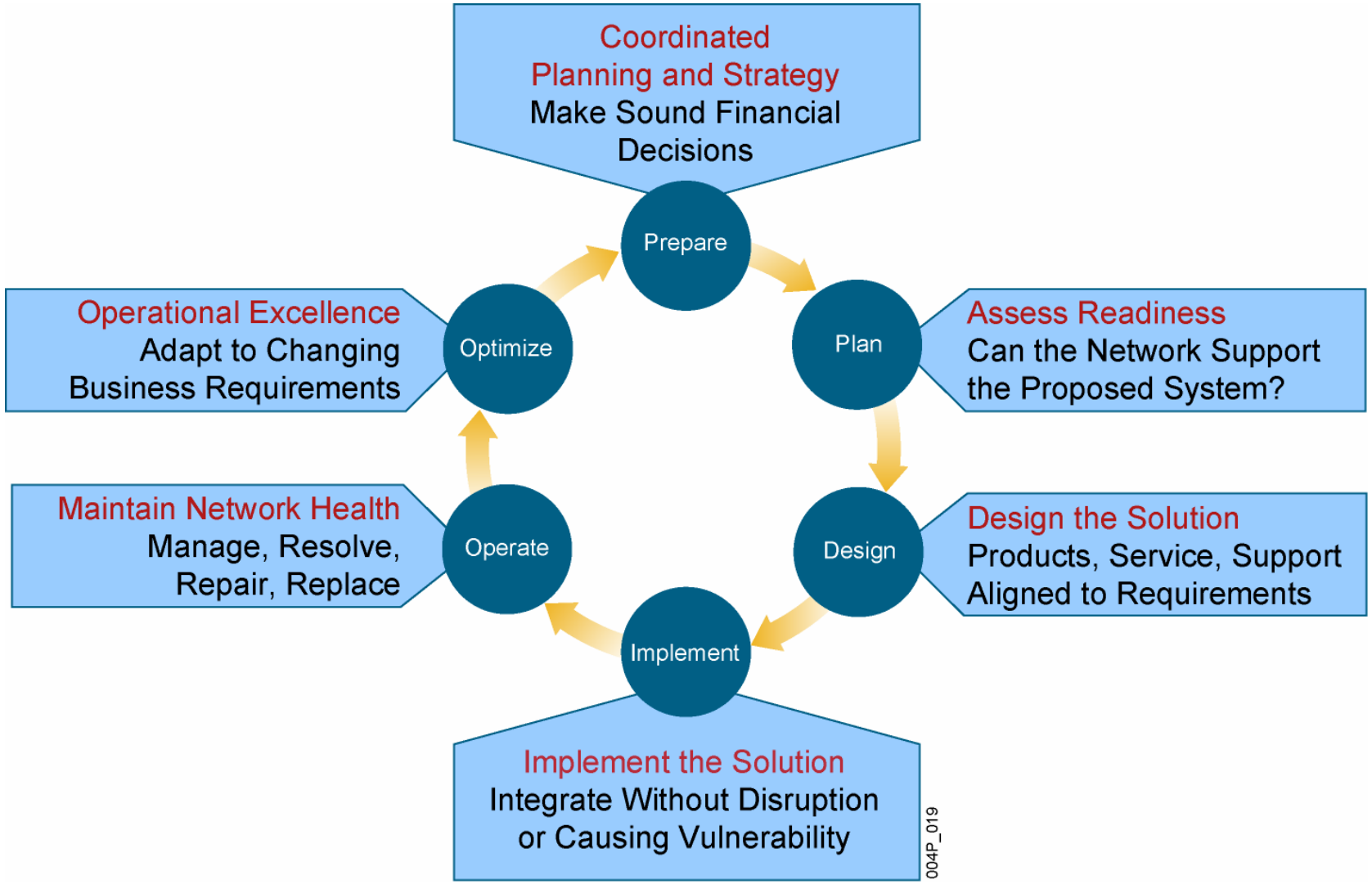
PPDIOO Network Life-Cycle Approach



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Benefits of the Life-Cycle Approach

Lower the Total Cost of Network Ownership

- Reduce operating expenses
- Improve network and staff efficiency
- Accelerate successful implementation

Increase Network Availability

- Assess ability to accommodate the proposed system
- Produce a sound design
- Stage and test; validate operation
- Proactively monitor and address availability, security

Improve Business Agility

- Establish business requirements and technology strategies
- Ready your sites to support the system
- Continually enhance performance

Speed Access to Applications

- Access and improve operational preparedness
- Improve service–delivery efficiency and effectiveness
- Improve availability, reliability, and stability of the network and applications

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Design Methodology Under PPDIOO

Three steps in the design methodology:

1. Identify the customer requirements.
2. Characterize the existing network and sites.
3. Design the topology and network solutions.

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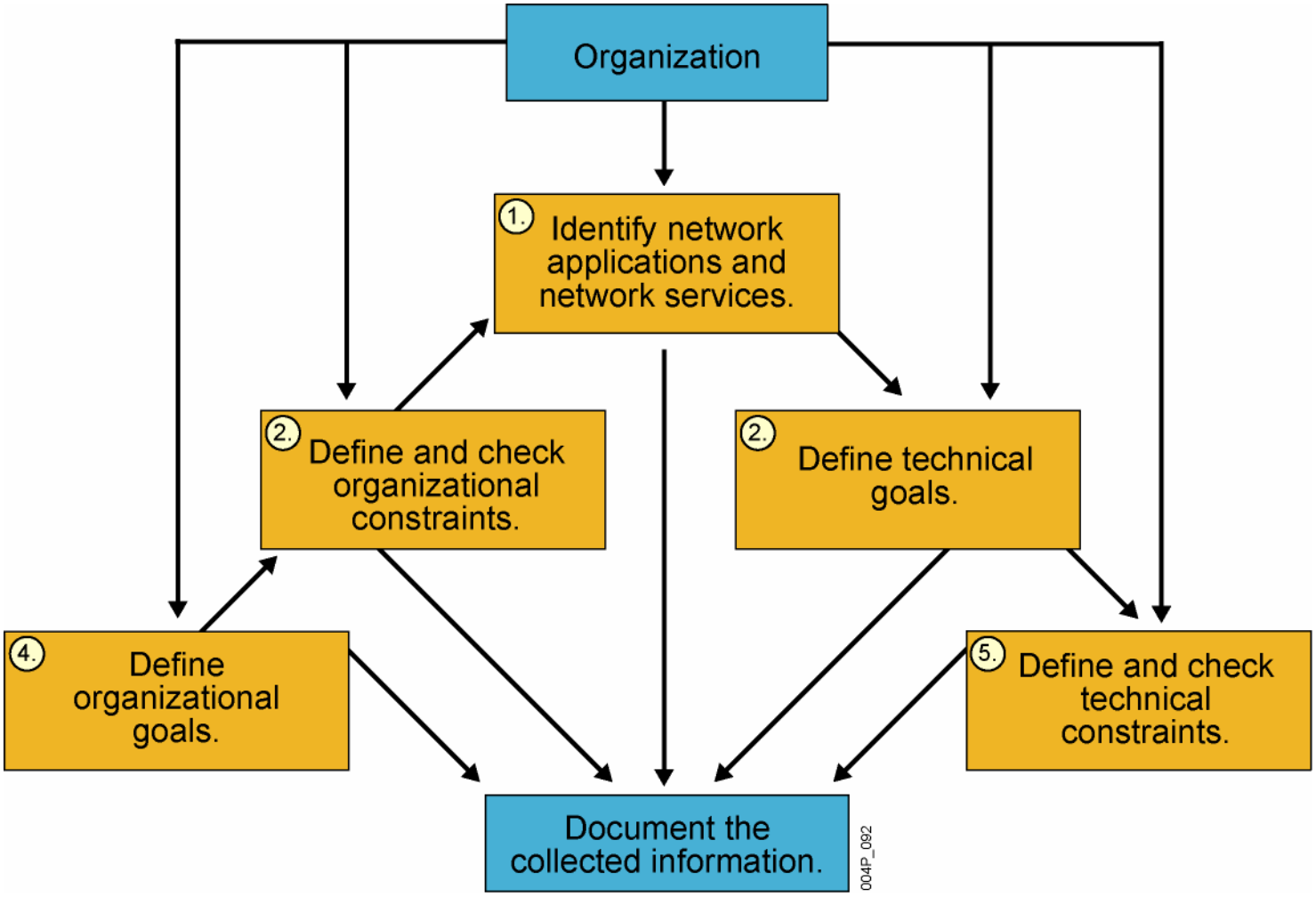
Identifying Customer Requirements



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Identifying Planned Applications

Application Type	Application	Criticality (Critical/Important/ Unimportant)	Comments
E-mail			
Groupware			
Web browsing			
Video on demand			
Database			
Customer support			

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Example: Planned Applications

Application Type	Application	Criticality (critical/important/ unimportant)	Comments
E-mail	Microsoft Outlook	Important	
Groupware	Cisco Unified MeetingPlace	Important	We need to be able to share presentations and applications during remote meetings.
Web browsing	Microsoft Internet Explorer, Opera, Netscape	Important	
Video on demand	IP/TV	Critical	
Database	Oracle	Critical	All data storage will be based on Oracle.
Customer support	Customer applications	Critical	

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Identifying Planned Infrastructure Services

Service	Comments
Security	
QoS	
Network management	
High availability	
IP telephony	
Mobility	

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Example: Planned Infrastructure Services

Service	Comments
Security	Deploy security systematically, including firewalls, intrusion detection systems (IOSs), and access control lists (ACLs)
QoS	Give priority to delay-sensitive voice traffic and other important traffic
Network management	Use centralized management tools where appropriate and point product management as required
High availability	Eliminate single points of failure and use redundant paths as needed
IP telephony	Want to migrate company from regular telephony
Mobility	Need client laptop guest access along with mobility of employee PCs

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Identifying Organizational Goals

Organizational Goal	Gathered Data	Comments
Increase competitiveness	List competitive organizations and their abilities	Point out possibilities to increase competitiveness
Reduce costs	List current expenses	Point out cost-reduction possibilities
Improve customer support	List current customer support	Point out possible steps to improve customer support
Add new customer services	List current customer services	List future desired services

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Example: Organizational Goals

Organizational Goal	Gathered Data (Existing Situation)	Comments
Increase competitiveness	Corporation Y, Corporation Z	▪ Better products ▪ Reduce costs
Reduce costs	Enter data multiple times; time-consuming tasks	▪ Single data-entry point ▪ Easy-to-learn application ▪ Simple data exchange
Improve customer support	Order tracking and technical support supported by individuals	▪ Web-based order tracking ▪ Web-based customer technical support tools
Add new customer services	Telephone and fax orders; telephone and fax confirmation	▪ Secure web-based ordering ▪ Secure web-based confirmations

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Assessing Organizational Constraints

Organizational Constraint	Gathered Data	Comments
Budget	Amount of money to spend	Identify the amount of money the organization is willing to spend
Personnel	List available personnel and their expertise	Specify the number of network engineers who have to attend the additional training
Policy	List preferred standards, protocols, vendors, applications	Determine if the organization is willing to buy equipment from new vendor
Scheduling	Specify time frame	Use tools for resource assignment, milestones, critical-path analysis

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Example: Organizational Constraints

Organizational Constraint	Gathered Data (Existing Situation)	Comments
Budget	$650,000	Budget can be extended by maximum $78,000
Personnel	Engineers with Cisco CCNA® certificates and Cisco CCNP® certificates	Plans to hire new engineers in the network department; need technical development plan
Policy	Prefers single vendor and standardized protocols	Current equipment—Cisco; prefers to stay with it
Scheduling	Plans to introduce new applications in the next nine months	New applications include video conferencing, groupware, and IP telephony

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Identifying Technical Goals

Technical Goals	Importance	Comments
Responsiveness and throughput		
Availability		
Manageability		
Security		
Adaptability		
Scalability		
Total	100	

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Example: Technical Goals

Technical Goals	Importance	Comments
Performance	20	Important of the central site, less important in branch offices
Availability	25	Should be 99.9 percent
Manageability	5	
Security	15	Security for critical data transactions is extremely important
Adaptability	10	
Scalability	25	Scalability is critical
Total	100	

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Example: Technical Constraints

Technical Constraints	Gathered Data	Comments
Existing wiring	Coaxial cabling	Replace existing coaxial cabling. Use twisted-pair to desktop and fiber optics for uplinks and in the backbone.
Bandwidth availability	64-kbps WAN links	Upgrade speeds; consider another service provider with additional services to offer.
Application compatibility	IPv6 based applications	Make sure new network equipment supports IPv6.

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Summary

- The PPDIOO approach reflects the life cycle phases of a standard network.
- The design methodology under PPDIOO includes these processes:
  - Identifying customer requirements
  - Characterizing the existing network and sites
  - Designing the network topology and solutions
- Key steps in identifying customer requirements include these:
  - Identifying network applications and services
  - Defining organizational goals and constraints
  - Defining technical goals and constraints

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