

DSS Architecture, Chapter 6 Networking and Security Issues

How is the architecture of a Decision Support System related to networking and security issues?



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Design architecture, networks, security

- Minimize support costs and maximize user productivity
- Avoid system crashes and other performance problems
- Reduce infrastructure impediments that delay the development of new IS/IT applications

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DSS Components

- Building Decision Support Systems
 - User Interface
 - DSS Database, Documents, Rules
 - Models and Analytical Tools
 - Communications and Network Infrastructure

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Network needs for Different Types of DSS

	Network	Thin-Client
Data-Driven	Usually	Java, Web pages
Document-Driven	Usually	HTML and PDF
Model-Driven	Sometimes	Java, JavaScript
Knowledge-Driven	Sometimes	Java, Web pages
Communications-Driven	Always	Java
Inter-Organizational	Always	Java, Web pages

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Distributed in three ways

- Thick-Client Architecture
- Thin-Client Architecture
- Java applets in a thin-client architecture

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Mathematical and Analytical Models

- Models and Model Management Software are either centralized on a server or distributed to client computers
- Java applets and JavaScript provide powerful new means of delivering models to users

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DSS Architecture and Networking



- How is the hardware organized?
- How is the software and data distributed in the system?
- How are the system components integrated and connected?

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Physical Architecture



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Major Issues

- Is DSS available using thin-client technology or a company intranet? Or a LAN?
- Access DSS from Global Internet?



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Information Systems Architecture Layers

- Business process architecture
 - Shows how tasks are completed
- Systems Architecture
 - Shows software components
- Technical Architecture
 - Shows Hardware components
- Product Delivery Architecture
 - Shows the Outputs of the System

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Why should we define a DSS Architecture?

- Helps developers work together
- Improves planning; more efficient and more coordinated
- Increases the team's ability to implement DSS
- Helps other groups implement systems that must work with DSS
- Ability to evaluate technology options within a context of how they will work rather than abstractly

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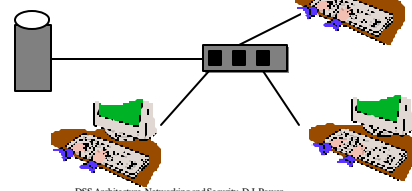
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Networked DSS

- Architecture diagrammed and understood before project approved

Server and A Network



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DSS Architecture Diagram Specifics (Mallach)

- Database or Databases
 - Internal/External
 - Who is responsible for each?
 - Accuracy, Currency, Security
- Model or Models
 - Sources of Data
 - Organizational responsibility for maintenance
 - Limits on access

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DSS Architecture Diagram Specifics (Mallach) Cont.

- Software Tools
 - Models and software tools which system administrators use to manage database and models
- Hardware and Operating System Platforms
 - Databases and Models
 - Programs
 - How users access the DSS

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DSS Architecture Diagram Specifics (Mallach) Cont.

- Networking and Communicating Capabilities
 - Need to connect to one or more servers and databases
 - Work group needs to communicate with the group
 - Enterprise needs to link workgroups to each other or to share data

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DSS Architecture Diagram Specifics (Lambert)

- Description of the problem the system is designed to address
- Objectives, constraints, and critical success factors for the system
- Project participants and roles
- System components and interfaces, connection paths

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DSS Architecture Diagram Specifics (Lambert)

- Anticipated system enhancements or modifications
- Development and maintenance schedule and staffing plan
- Skills, tools, and support required to implement system development and maintenance

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Network

- Allows computers to communicate with each other
- Need a common language
- Have "host" to facilitate sharing

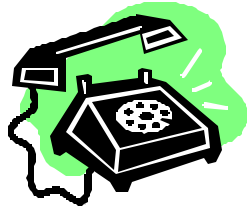
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Connections

- Ethernet
- Token Ring
- Serial Line
- Modems



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Network Protocols

- Set of rules and formats that govern how information is sent
 - TCP/IP (Internet and UNIX)
 - IPX (Novell)
 - AppleTalk

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Computer Networks

- Provide access to shared resources
 - Local Area Networks (LANs)
 - Network interconnection and hubs
 - Network interface circuitry (NIC) in individual personal computers
 - Shared resources like a database server, each with their own NIC
 - Software on a personal computer that uses NIC to access shared resources

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Network Operating System

- NOS coordinates with the software on the individual machines to provide access to the shared resources for users



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TCP/IP

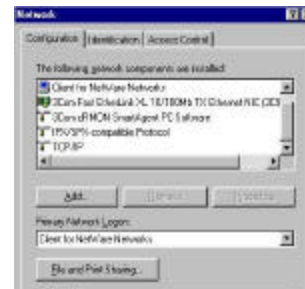
- Transmission Control Protocol/Internet Protocol
 - Enables dissimilar nodes in a heterogeneous environment to communicate with each other
 - Idea arose from research by the Defense Advance Research Projects Agency (DARPA)

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PC Network Configuration



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Why TCP/IP?

- Has been used since early 1970's
- Dependable
- Can use it exclusively over their own private internet or as part of the WWW
- Distributed as a core part of Berkeley's UNIX version 4.2
 - UNIX workstations became primary servers on the internet

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TCP/IP Protocol



- Objective: Get from one host to another
 - Connectionless delivery service
 - A mechanism for fragmentation and reassembly
 - Routing functions

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Security for a DSS

- How important is the DSS?
- How much effort is required to make and keep system secure?
- How will the security features effect DSS users?

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Implementation of IS/IT Security



- Identify possible threats
 - Physical
 - Theft of equipment
 - Vandalism
- Computer Security Policy (CSP)
 - Document that sets out rules and principles which effect the way an organization approaches security problems

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Watch for Hackers

- Steps to break into a DSS
 - Gather information
 - User names, phone numbers, office locations
 - Attempt to get a login account
 - Make changes to gain access or control of the system



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Remedying Problems and Implementing Solutions

- Improve password security
 - User education!!
 - Password generators
 - Password aging
 - Regular password cracking
 - One-time passwords



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Questions for Review and Discussion

- What is a DSS Architecture?
- What is TCP/IP?
- Do passwords protect a DSS?
- How would you break-in to a DSS?

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Recommendations?

What type of network and DSS architecture would you recommend for a small company located within a single building? The company currently has 25 PCs located in three departments. All of the computers are stand-alone systems. The microcomputers are used to track production, maintain customer sales information, and create the company catalog of products and other materials for mailings. The company wants to use groupware and build a Data-Driven DSS.

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