

BTech 450 Project

Best Practices for Information System Design

Project Presentation

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Agenda

- Objective
- Approach
- Development
- Problems
- Conclusion
- Questions

Objective

- Design a model information system for a “mid-sized” company
 - Not directly related to computer industry
 - Head office, 30 employees
 - Two branches, 5 employees each
 - 7 mobile works (5 + 1 + 1)

Objective

- **Requirements**
 - **High Availability (24/7)**
 - **High Performance**
 - **Remote Access / Mobile Workers**
 - **High Security**
 - **Fast Disaster Recovery**
 - **Commercial Practicality**

Approach

1. Set Requirements

Software, hardware, services

2. Research

Verify requirements

Find suitable solutions

3. Design Template

Put everything together

Approach

- **Fitness For Purpose (FFP)**

Does the design satisfy our needs?

- **Total Cost of Ownership (TCO)**

How much does it cost to get it running?

- Startup cost
- Operating cost

1. Set Requirements

Visualization
Identify Requirements

Visualization

- Visualization of the final deliverable
- Help to identify the major components and requirements in the system
- The final design may or may not be based on this

Visualization

- **Software**
Support for custom applications
- **Workstation**
Configurations
Process Worker
Knowledge Worker
Centralized File Storage

Visualization

- **Server**

- Public Website & E-mail

- Internal Website

- File Server

- Backup Server

- **Services**

- System Admin

- Backup

- **Remote Access**

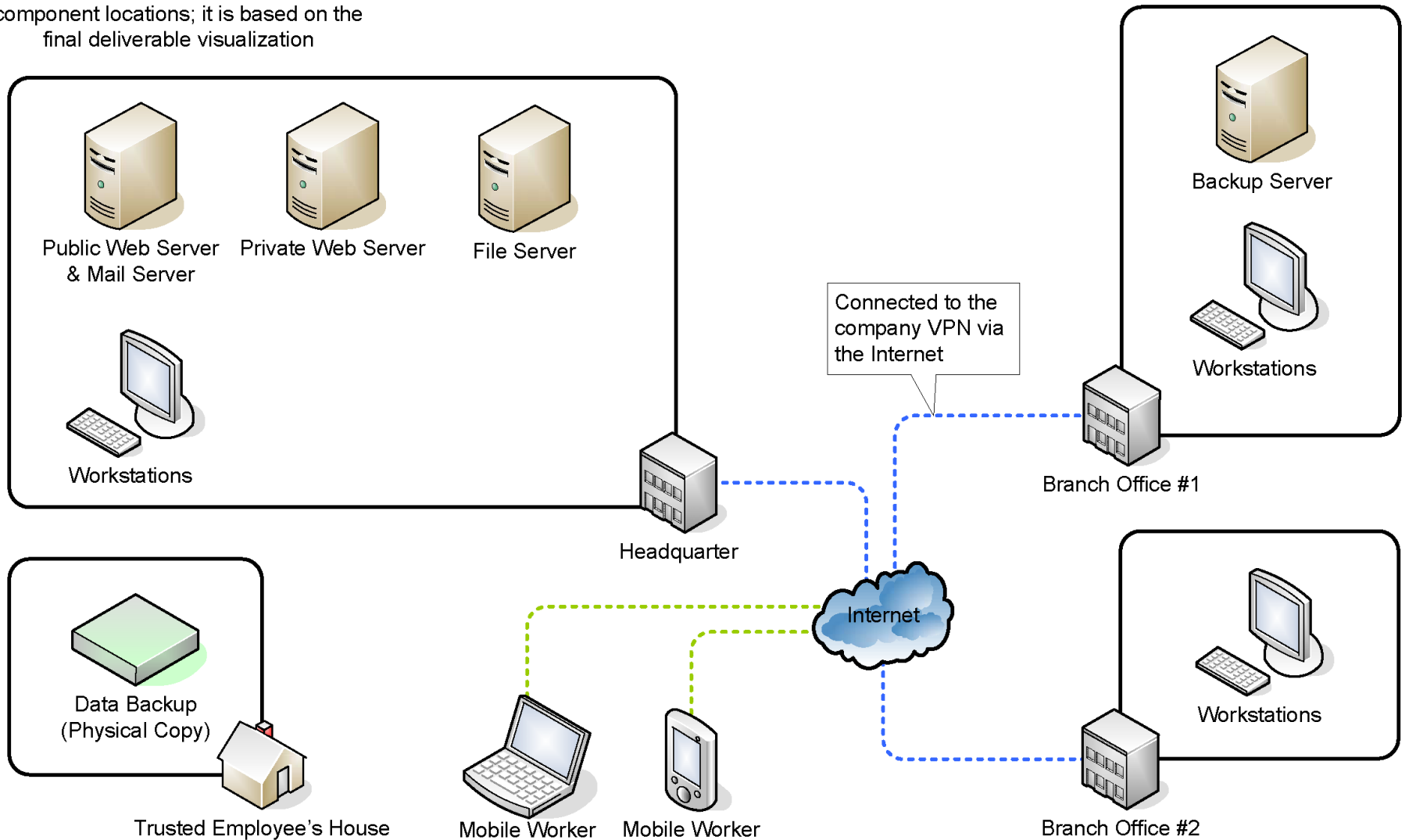
- Virtual Private Network

- WAP version of website

- Terminal Services

Preliminary Topology

This topology diagram shows the main component locations; it is based on the final deliverable visualization



Identified Requirements

- From the visualization, we have identified several requirements

Software

Workstation

Server

Services

Identified Problems

Network

How are the computers and servers connected?

What kind of internet connection is necessary?

Servers

Are the different servers really required? Can they be combined?

What about redundant servers?

Backup power?

Identified Problems

Remote Access

What kind of remote access is necessary?

Is terminal services really required?

Mobile Worker

In order to ensure service quality, does the company need to supply notebook/PDA and the internet connection?

Others

What about security, anti-virus and firewall?

Disaster recovery?

2. Research

Verify the requirements

Find suitable solutions

Research

Resources Consulted

- Internet
- IEEE & ACM Database
- Information System student

Research

Different types of information

Educational

Basic understanding of how things work

e.g. What is RAID and how it works

Practical

Knowledge accumulated from experience

e.g. How much bandwidth would a mid-sized company use?

Research

Different types of information

We need practical information

Practical Information

Easy to come by?

All over the Internet?

Practical Information

On the Internet

Plenty of sites...

- How to build your own PC
- Many tips on how to maximize PC performance
- How to setup your own web server

Many discussion forums

Practical Information

But wait!

What we need is practical
information for commercial level
application

Practical Information

On the Internet

What are some cost effective ways to build a high-availability cluster server?

Practical Information

On the Internet

Very rare

No website on how to build a reliable
LAN for their company

No forums discussing what kind of
server redundancy solution to use

Practical Information

On the Internet

Proprietary solutions

More organized

e.g. Microsoft

Open source solutions

Tend to be messy

e.g. Linux

Still very few practical info for both cases

Most are educational

Practical Information

IEEE & ACM Database

Lots of publications

But most are academic studies

Too theoretical

Not been tested, proven

Cannot be easily put into practical use

Usually no commercial implementations

Practical Information

Information System Student

Knows a bit more about system
integration

But still clueless when it comes into
practical stuff

Practical Information

One of the few useful information...

- “Redundancy with Standards in Industrial Ethernet LANs” by GarrettCom
- Suggest the use of ring topology and IEEE 802.1w Rapid Spanning Tree Protocol for redundancy

Practical Information

“Redundancy with Standards in Industrial Ethernet LANs”

- Ring topology
 - Easy to setup, minimizes cabling and cost
 - Can be easily converted into partial mesh for higher redundancy
- Rapid Spanning Tree Protocol
 - Very fast route convergence time
 - Available in commercial equipments

Practical Information

In the end, there's not enough
information to continue to design
phase

Lots of time spend on research, but
not much results in return

Very frustrating 😞

Other Factors

Subject not student's field of study

- Have no idea about system integration**
- Have to learn everything**

“IT” is (almost) all about programming

- Name might be a bit misleading**

Things in CS

CS742

IPv6 multihoming using “shim6”

- Reduces single-point-of-failure of IPv4MH which relies on a router
- But this standard is not finalized

Future

Recommendations

- Reduce the scope size
 - e.g. focus on server clustering
- Maybe change this into an INFOSYS project?
 - But it seems they do lots of programming too...
- Put a “Warning” on this kind of research projects
 - So students will think about it carefully before choosing
 - Experience gained might not be match future working environment

Questions?

The End

Thank you for your interest in this presentation