Unite Technology Conference

Basic Network Security For The ClearPath MCP User

Michael S. Recant
MGS, Inc.

Session AS4076
9:15am - 10:15am
Thursday, November 8, 2001

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Introduction

MGS, Inc. is a ClearPath MCP software development and consulting firm

remote computer access is critical to our business

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Introduction

- Introduction
- The Business Problem
- Communications Technology
  - Point of Control
  - TCP/IP Basics
- Access Control
  - “Guarded Gate” Strategy
  - “Extended Office” Strategy
- Security Considerations
- References

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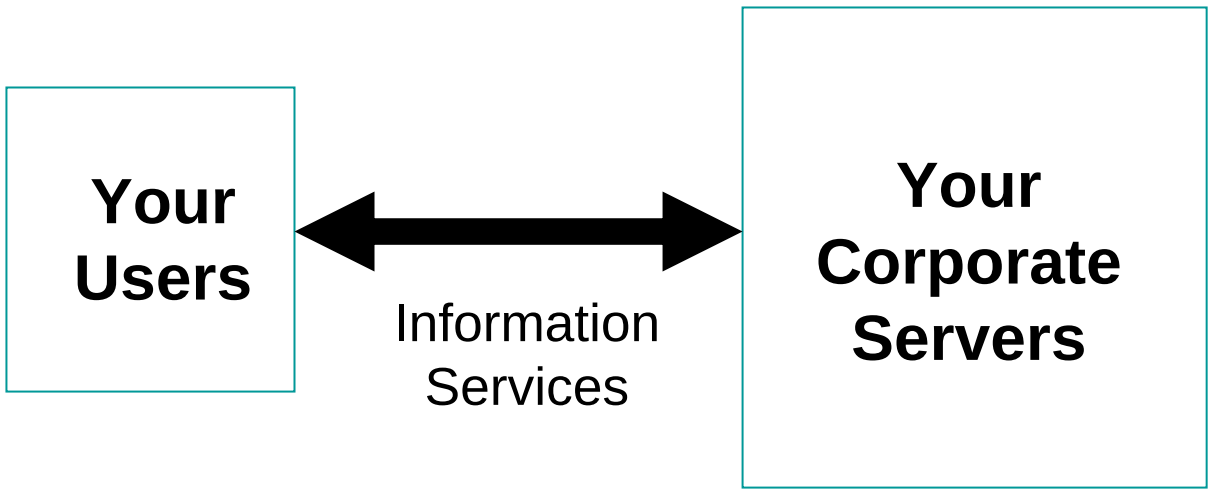
The Business Problem

Your job is to provide ....



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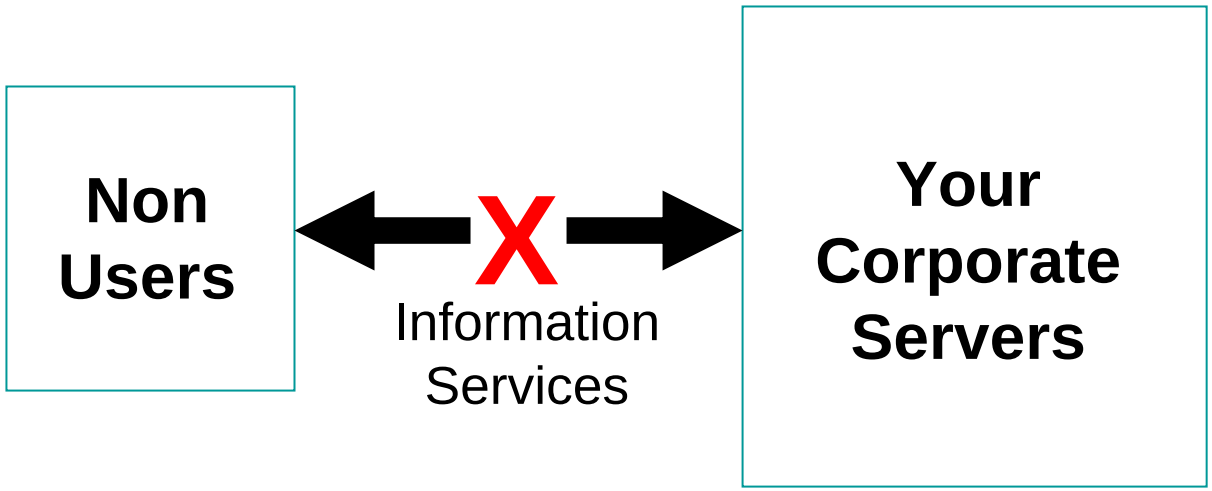
The Business Problem

Your job is also to insure ....



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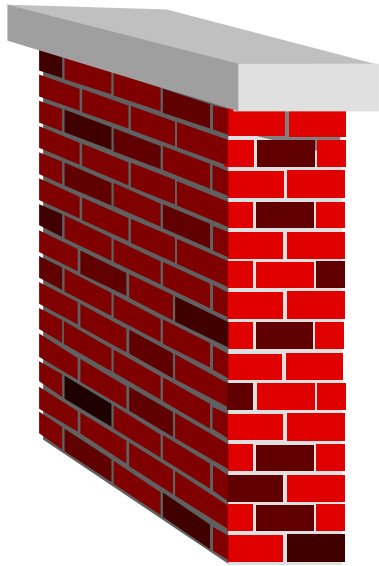
The Business Problem

The historical approach ....

Your Users



Your Corporate Servers

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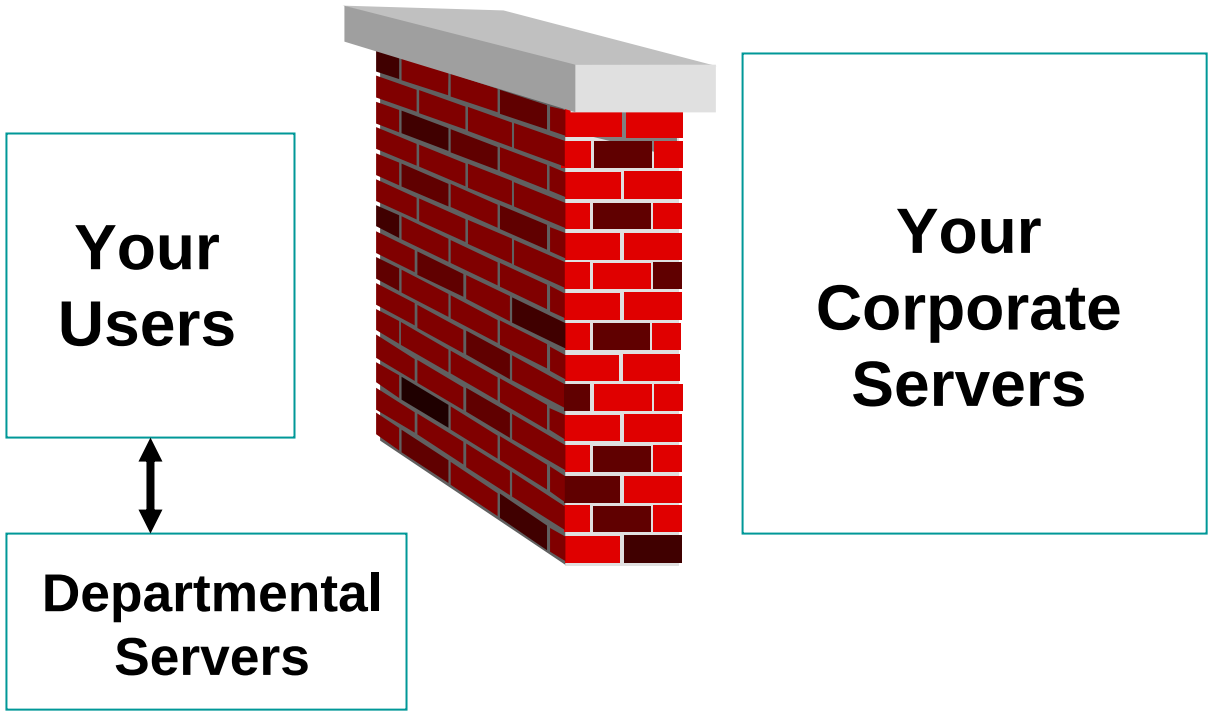
The Business Problem

The historical response ....



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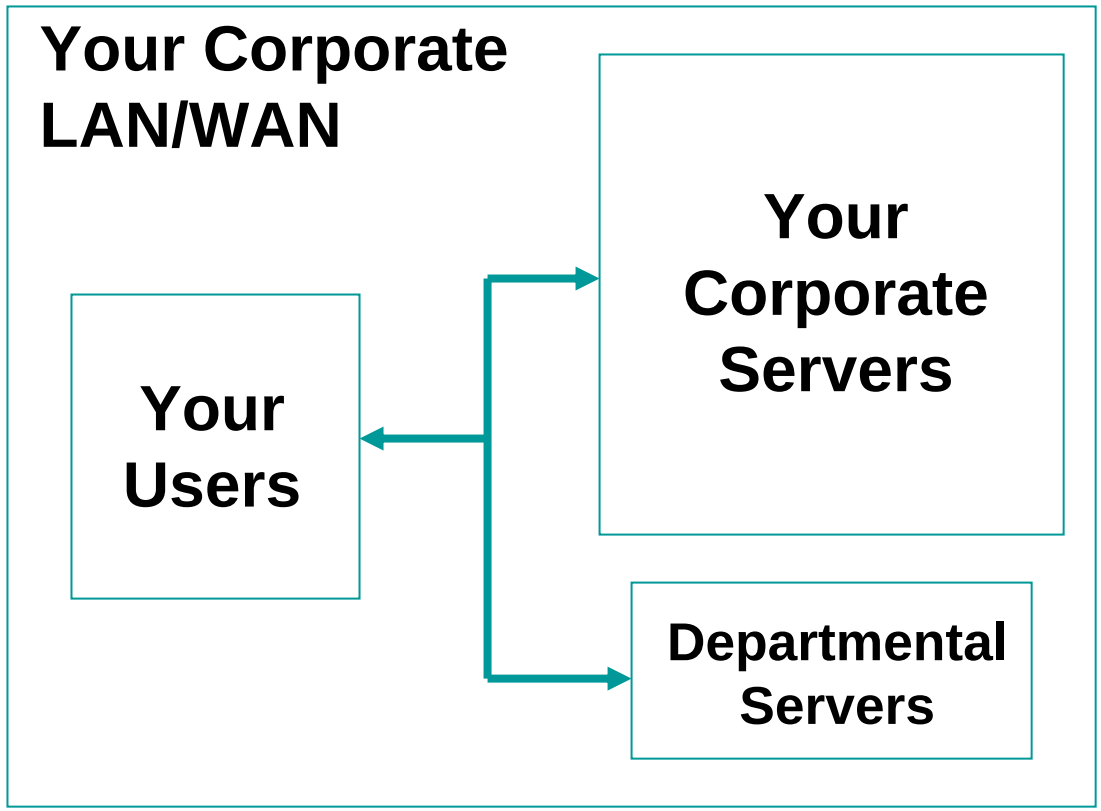
The Business Problem

The solution ....



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The Business Problem

User

User

User

User

User

User

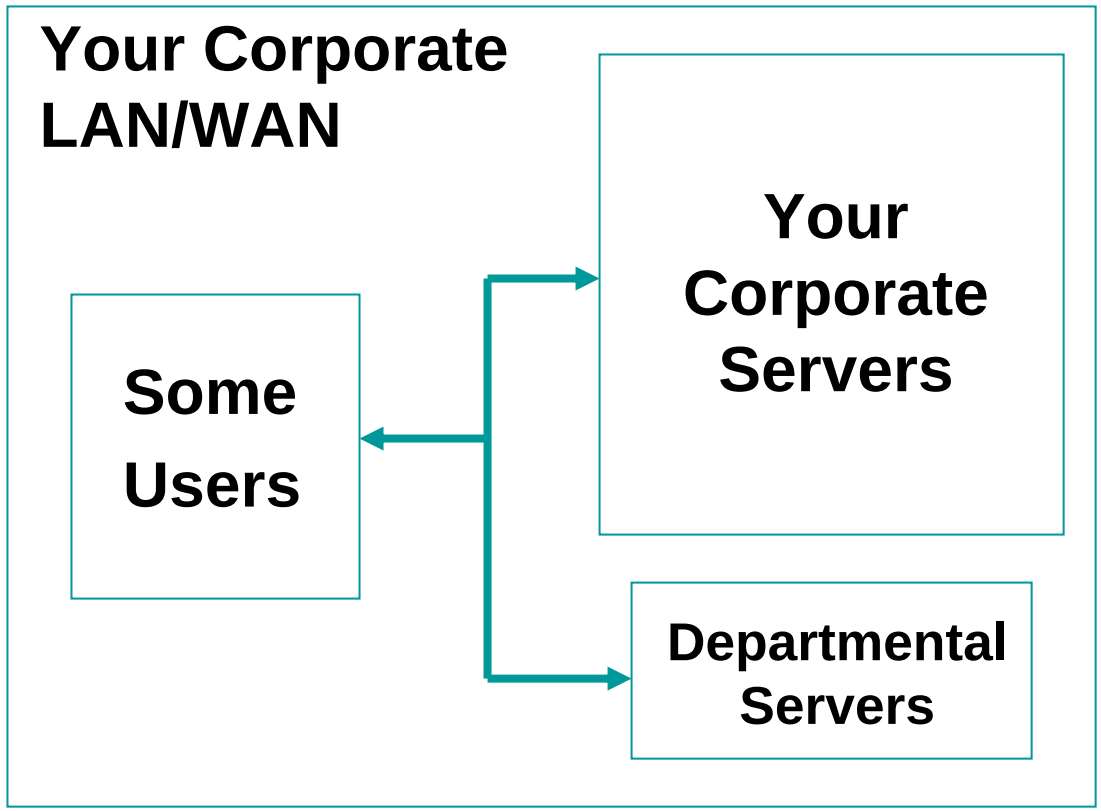
User

User

User

User

But now there is a new problem ...



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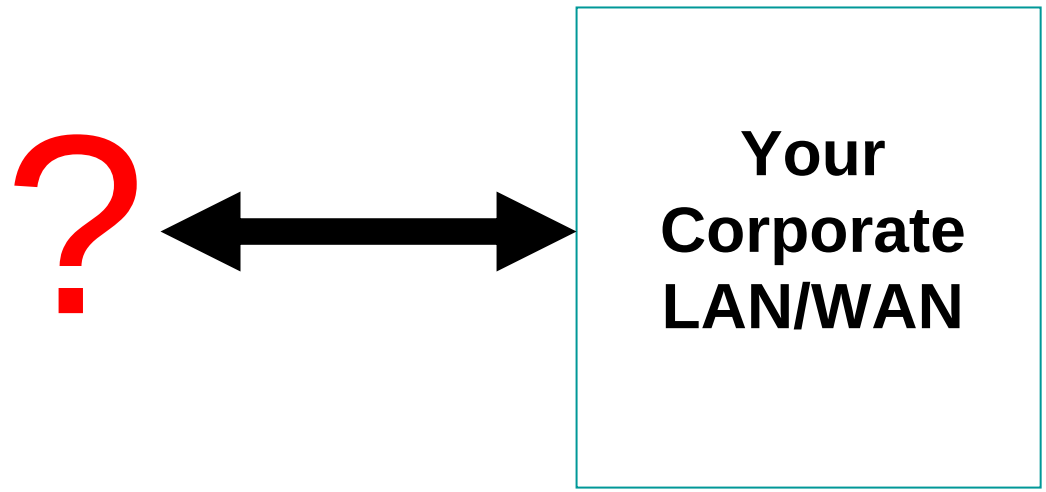
The Business Problem

The problem has a name, it is called the Internet ....



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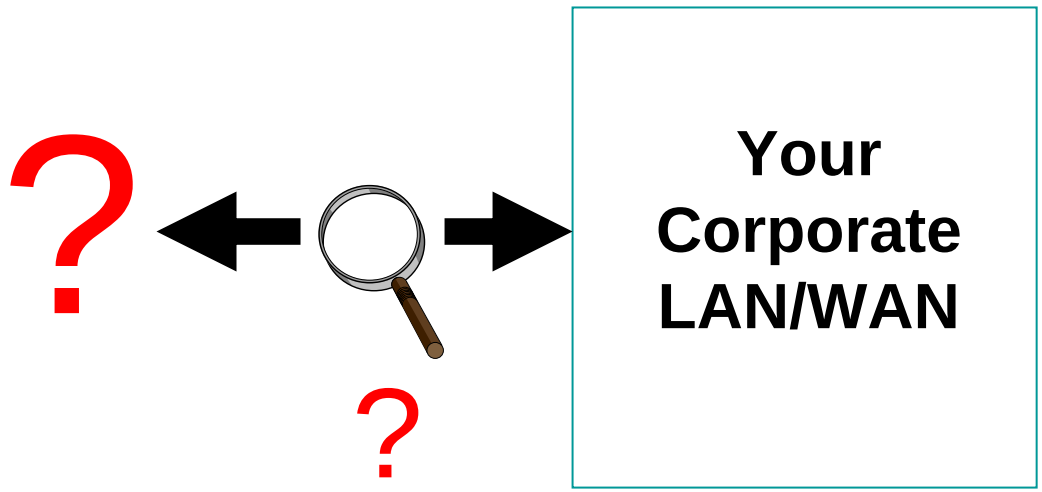
The Business Problem

And the problem is worse than you think ....



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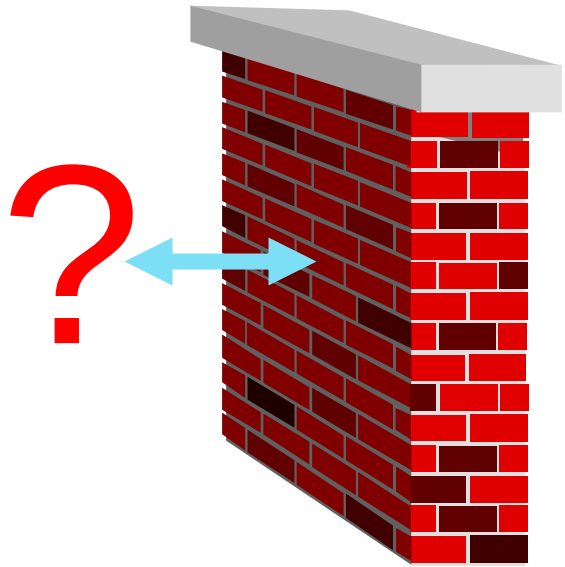
The Business Problem

The perfect IS solution ....



Your Corporate LAN/WAN

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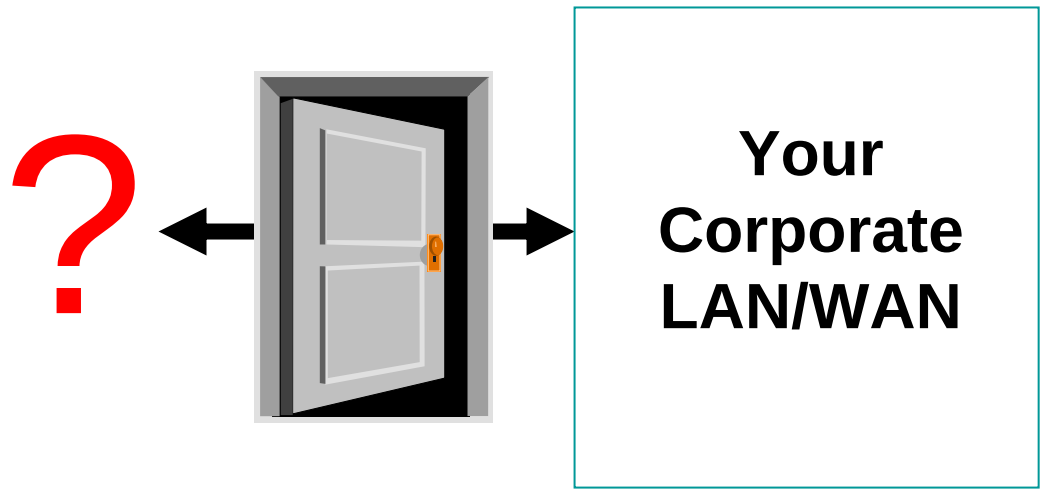
The Business Problem

The perfect user solution ....



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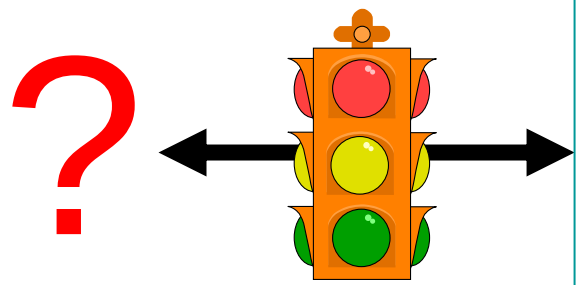
The Business Problem

Your job is to meet both goals ....



Your Corporate LAN/WAN

.... but how can you do that?

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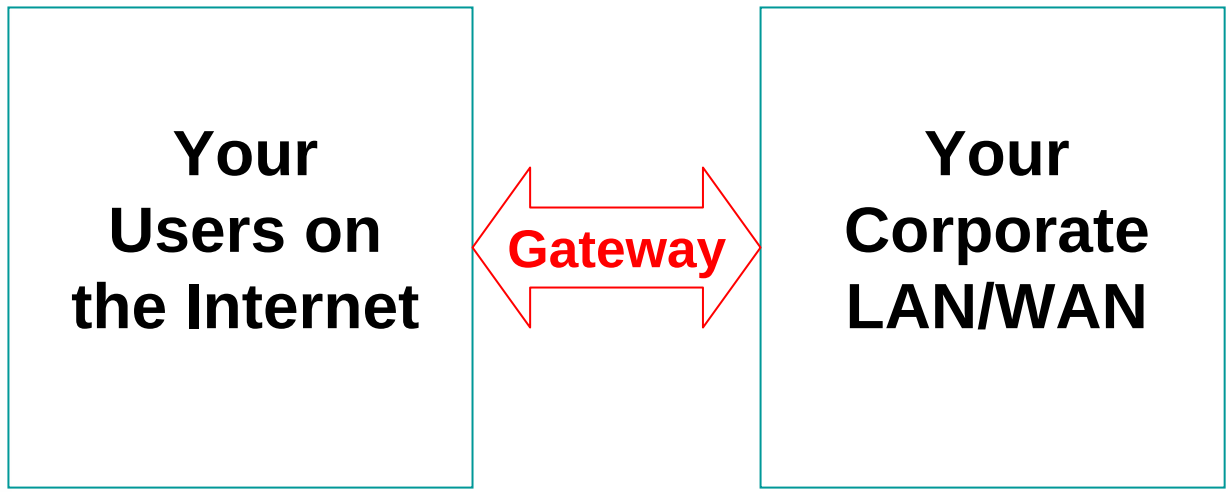
Communications Technology - Point of Control

Somewhere there is a boundary ....



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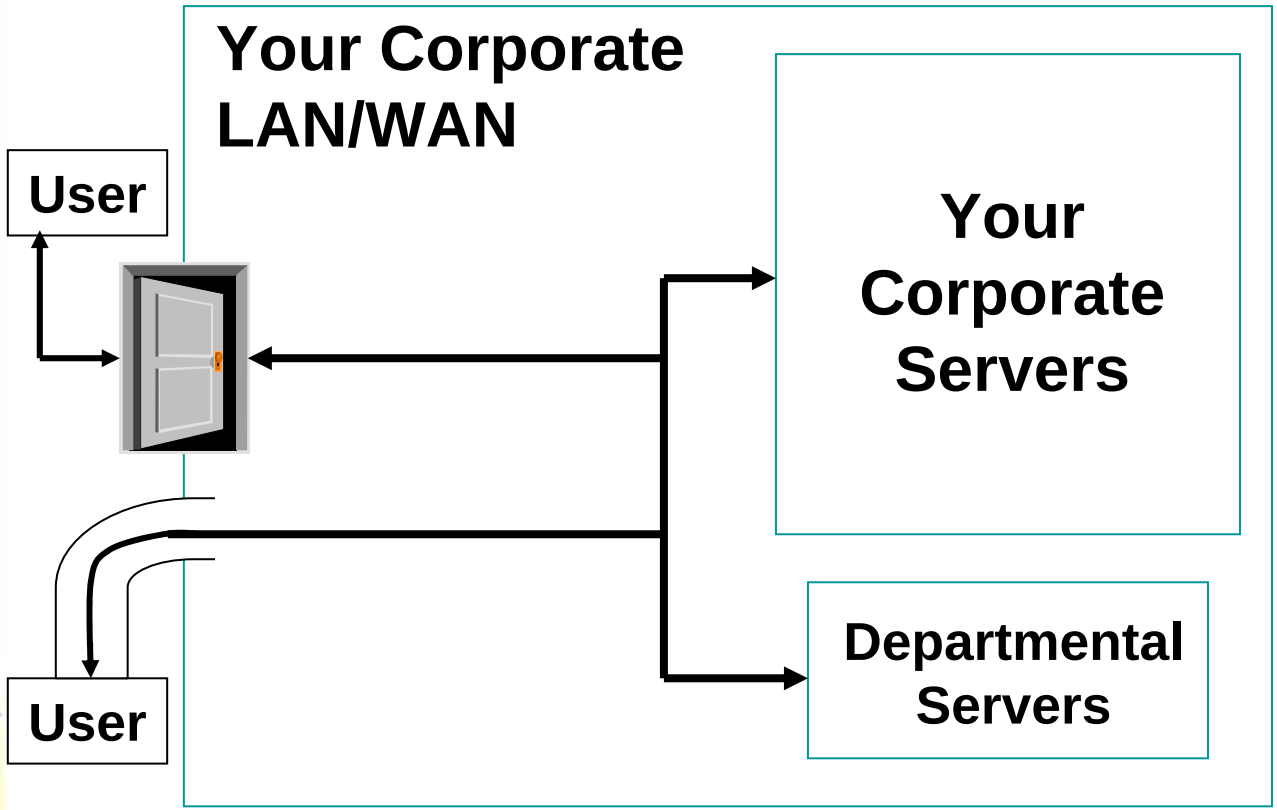
Communications Technology - Point of Control

Control access through the boundary



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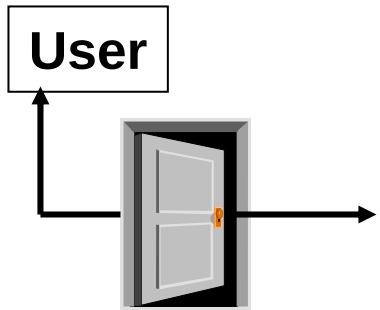
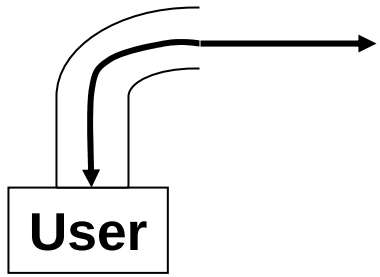
Communications Technology - Point of Control

The two standard techniques are ....



Guarded Gate



Extended Office

but first, what actually goes through the boundary?

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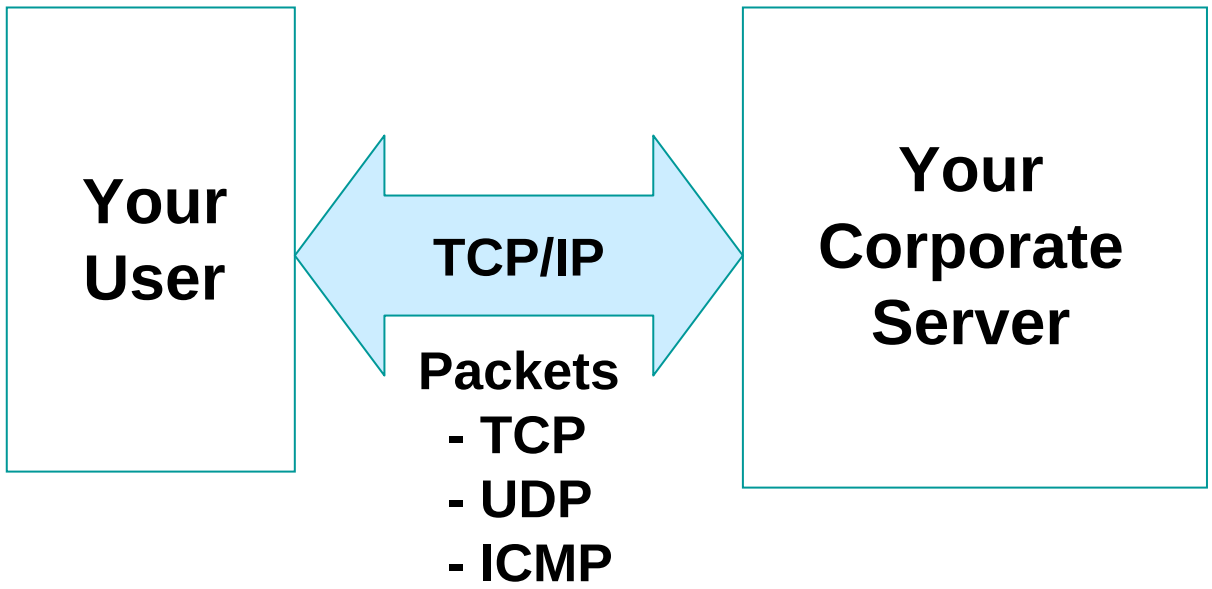
Communications Technology - TCP/IP Basics

Current communications technology is based on TCP/IP



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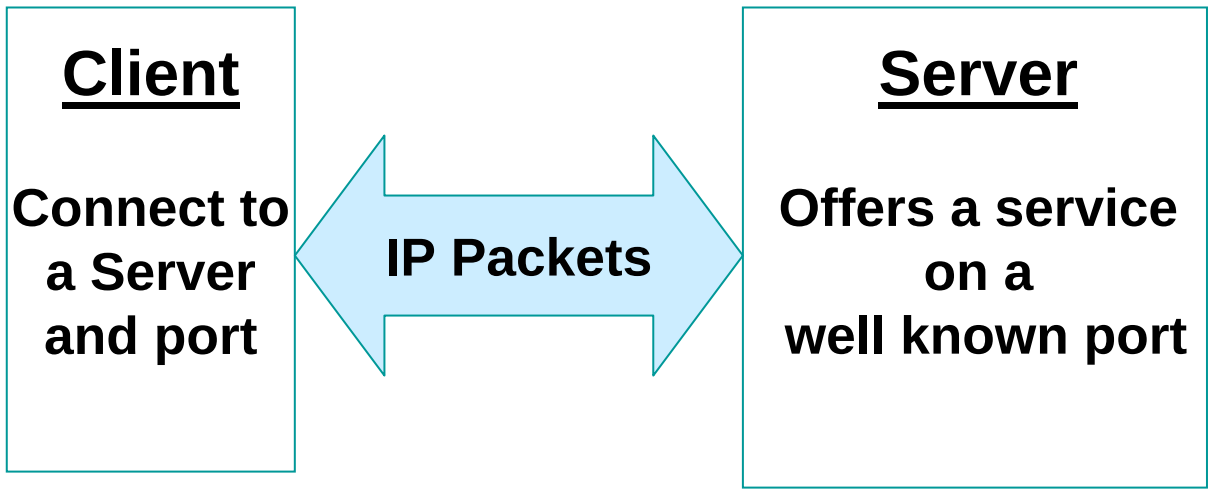
Communications Technology - TCP/IP Basics

TCP Client software connects to services offered by TCP Server software



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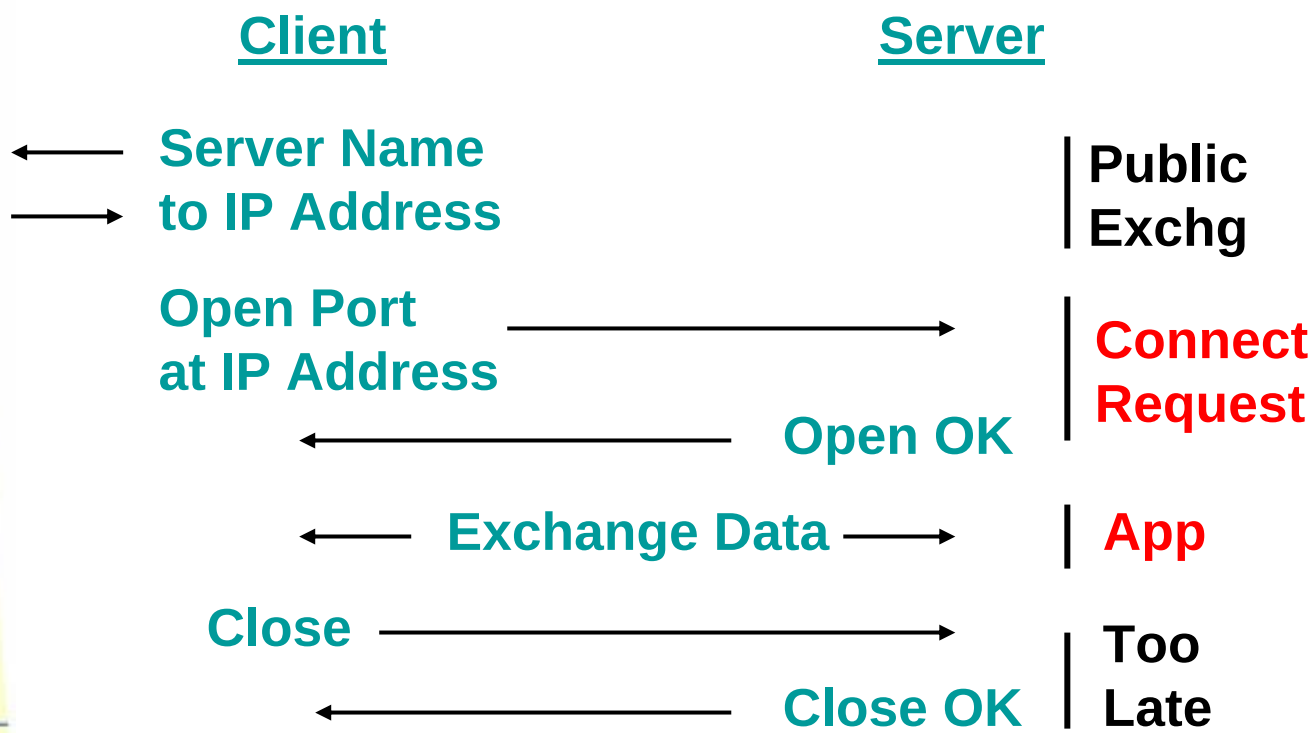
Communications Technology - TCP/IP Basics

TCP communications process



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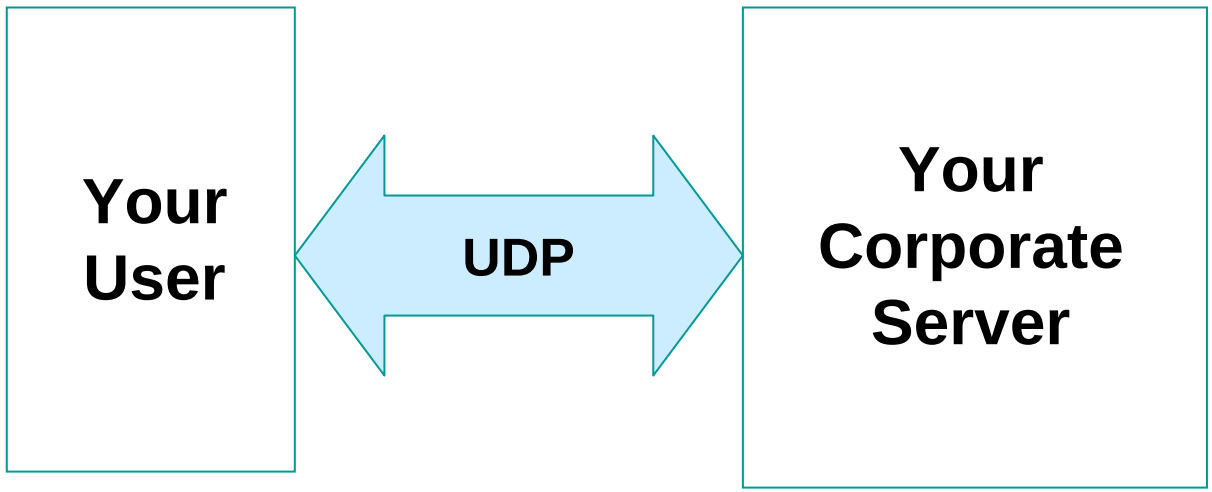
Communications Technology - TCP/IP Basics

UDP client/server software interacts using “connectionless” communications



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Communications Technology - TCP/IP Basics

UDP communications process

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Communications Technology - TCP/IP Basics

ICMP exchanges are similar to UDP

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Access Control - Overview

Two basic access control strategies

- "Guarded Gate" Strategy
  - Firewall
  - Application Level Security
- "Extended Office" Strategy
  - Virtual Private Network
  - Internet Protocol Security

Access Control - Guarded Gate Strategy

A Firewall is used to control server access

- Firewall is placed between the Internet and your Corporate data processing
- Looks at each individual TCP connection to decide if it is OK
- Looks at an individual UDP or ICMP packet to decide if it is OK

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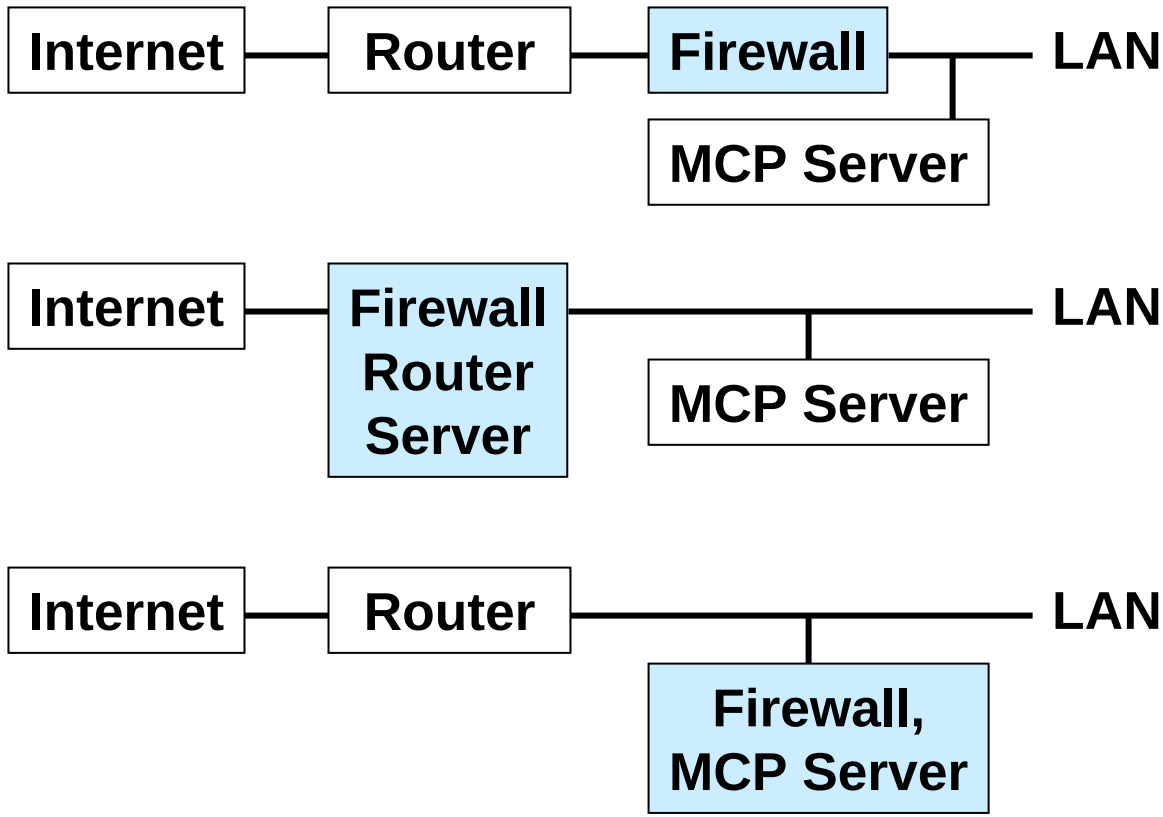
Access Control - Guarded Gate Strategy

Where can you put the Firewall?



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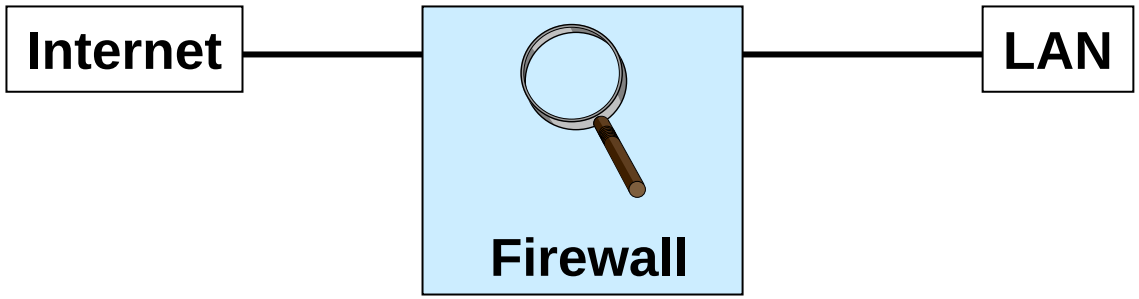
Access Control - Guarded Gate Strategy

The Firewall inspects all TCP/IP packets



- Server IP Address
- Server Port number
- Client IP Address
- Client Port number
- TCP, UDP or ICMP

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Access Control - Guarded Gate Strategy

Firewall Considerations

- What decisions can be made?
  - The default should be to always deny access
  - Allow unrestricted access to “public” services
  - Allow limited access to “private” services by “known” IP Addr
- Remember that data is visible unless the application uses encryption

Access Control - Guarded Gate Strategy

Application level security limits are imposed by the individual server/app

- Requires application modifications
- Does not secure other servers and other applications
- Client and server must be security aware
- SSL provides security for WEB Browser/Server exchanges

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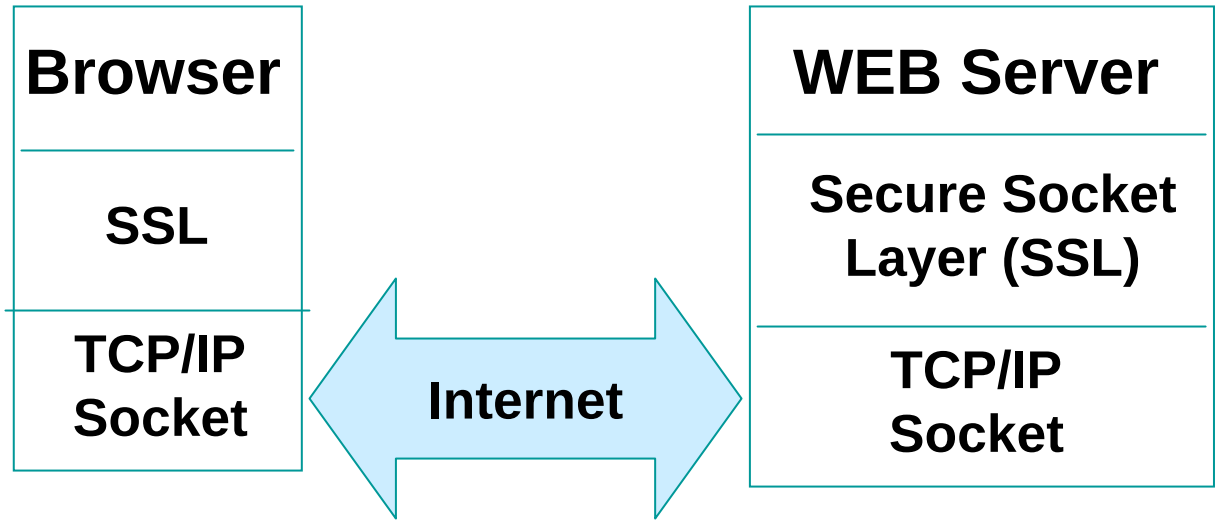
Access Control - Guarded Gate Strategy

Application-to-Application is secure ....



.... but nothing else is

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Access Control - Extended Office Strategy

Virtual Private Network (VPN)

- Provides a secure “tunnel” through the Internet
- TCP/IP is unaware of the “tunnel”
- TCP/IP communication is not restricted

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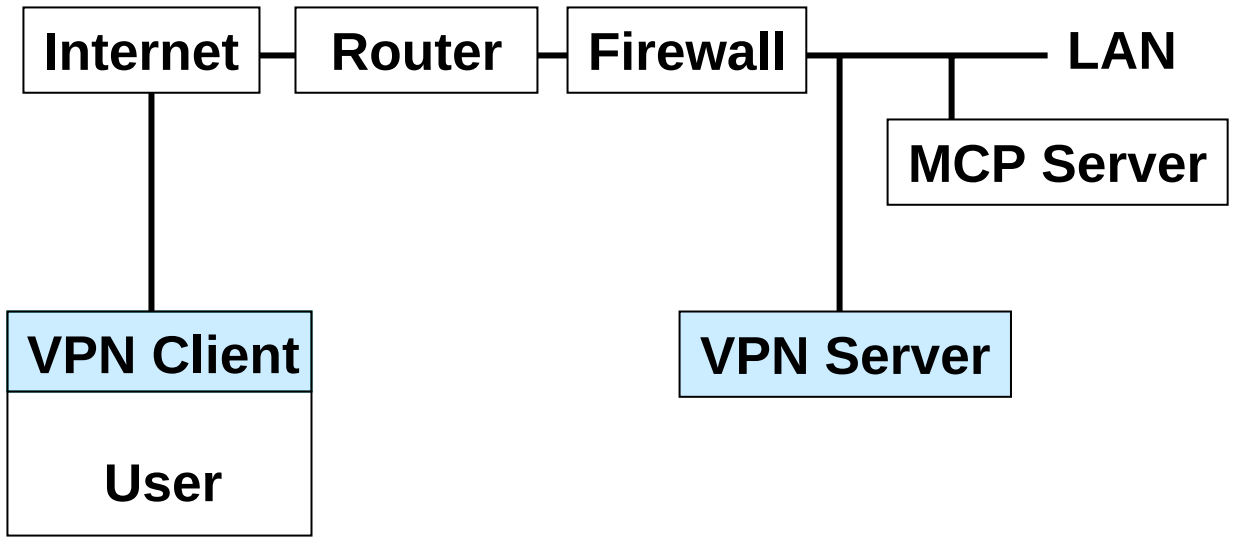
Access Control - Extended Office Strategy

Where do you put the VPN “tunnel”?



VPN - Virtual Private Network

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Access Control - Extended Office Strategy

VPN Considerations

- User appears to be on the Corporate LAN/WAN
- VPN client/server can provide authentication and encryption
- User's PC must be considered a physical extension of the "office"
- VPN client environment
  - must not be replicable
  - requires external password

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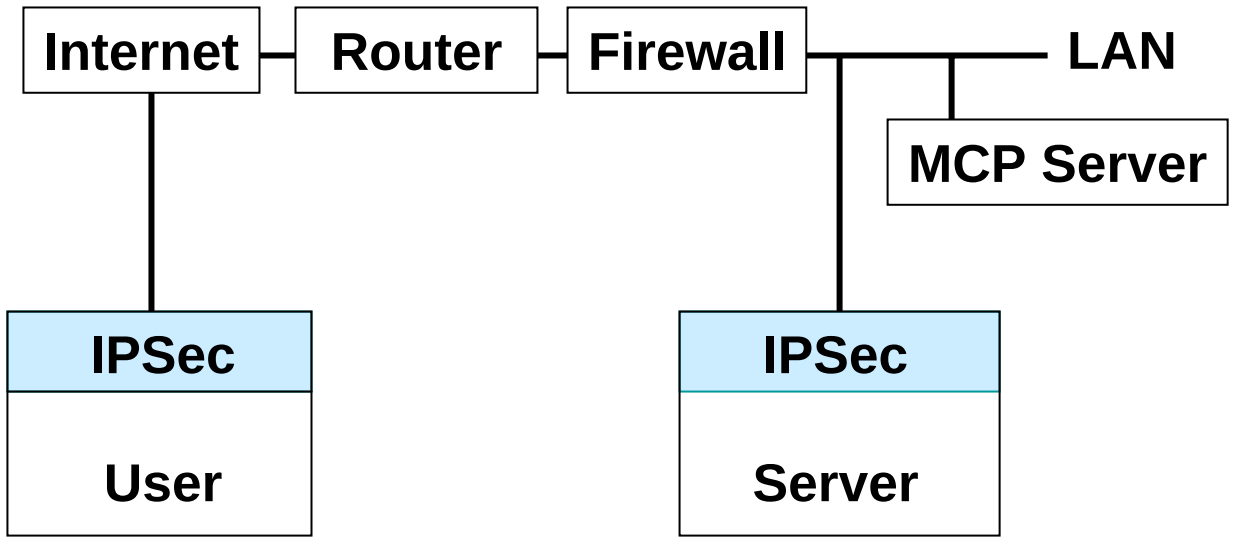
Access Control - Extended Office Strategy

Internet Protocol Security (IPSec)

- Provides security encapsulation for TCP/IP communication
- TCP/IP is unaware of the encapsulation
- TCP/IP communication is not restricted

Access Control - Extended Office Strategy

Secure computer-to-computer communications



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Access Control - Extended Office Strategy

IPSec Considerations

- Secure computer-to-computer link that provides authentication and encryption
- Applications are unaware of IPSec
- Runs below the TCP/IP protocol stack (OS Support required)
- May require participation in a security domain
- Firewall/NAT issues

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Security Considerations

Overall Security Goals

- Authentication - is the user who he claims to be and what access is he allowed
- Encryption - provides data integrity, replay prevention and eliminates the possibility of eavesdropping
- Non-Repudiation - provides verification so the sender cannot deny sending the message

Security Considerations

Guarded Gate Strategy

- Only exposes specific services
- Identify “public” services like Mail, Web, FTP as they require monitoring
- Do not “publicly” expose services that provide general access
  - weak usercode/password
  - hard to audit
  - Example: TELNET

Security Considerations

- Guarded Gate Strategy
  - Attach a revocable limit to “private” services
    - Usercode/password is not enough
    - plan for terminated employee
  - Understand your application’s security
    - TELNET
    - FTP
    - WEB

Security Considerations

Guarded Gate Strategy

- Don’t expose Microsoft’s networking services or WinRPC
  - Limited by many ISPs
  - Many security bugs
  - Near impossible to audit
- Enable PING/TRACEROUTE for all exposed servers

Security Considerations

Extended Office Strategy

- The user PC is now an extension of the office
- When terminating an employee get his PC when you get his office key
- Use encryption
- If possible, limit user access through VPN
- If possible attach an IP Address or hostname to each VPN user

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Security Considerations

ClearPath MCP Considerations

- Supported ClearPath MCP services/port
  - FTP 21
  - TELNET 23
  - SMTP 25
  - WEB 80
  - HOSTS2 81
  - ONC+RPC 111
  - NXEDIT 129
  - NETBIOS 139
  - SNMP 161
  - ??? 279
  - LPD 515
  - WINRPC ???

Security Considerations

ClearPath MCP Considerations

- In general, do not open a ClearPath MCP server to the Internet
- WEB can be safely exposed
- SSL supported
- Only expose required services
- Limit access to exposed services
- IPSec not supported

Reference Material

- TCP/IP Illustrated, Vol 1 by W. Richard Stevens, Addison-Wesley
- TCP/IP Illustrated, Vol 2 by W. Richard Stevens, Addison-Wesley
- Business Data Communications and Networking by Fitzgerald & Dennis, John Wiley & Sons, Inc
- TCP/IP Network Administration by Craig Hunt, O'Reilly & Associates, Inc.
- Microsoft Windows 2000 Server TCP/IP Core Networking Guide (Windows 2000 Resource Kit), Microsoft Press
- Unisys e-@action ClearPath Enterprise Servers Security Administration Guide for MCP 6.0 (860 0973-407)

Additional Questions?

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