

SENA

One-Stop Solution in Device Networking

VTS Series Console Management Server



April, 2003

SENA
TECHNOLOGIES

Table of contents

□ Console Server

- Backgrounds
- Effects of network-down
- Factors and solutions of network-down
- Necessity of out-of-band management
- Out-of-band management solutions
- Serial Console Port
- Console Server

□ VTS

- VTS Overview
- VTS Features
- VTS Benefits
- VTS Applications
- VTS Review

Backgrounds

Today's network environment

❑ **Current environment**

- Clustering / downsizing / Server farm
- Small decentralized system
- Daily-growing Internet infrastructure
- Complex systems
 - Various passages to Internet such as wired, wireless, mobile and fiber
- Various equipments in network infra such as UPS, Environmental controllers

❑ **On-going trend**

- Scalability – Adding additional nodes
- High Availability – Maximizing network up-time
- Flexibility – Integrating heterogeneous equipments
- Lower Costs

❑ **Problems**

- **Increasing number of nodes to be managed**
- **Numerous types of the equipments**
- **Frequent network-down problems**

Effects of network-down

❑ Damages of network downtime

– Employees

- IT related tasks are not executed.

– Users

- User related actions cannot be taken.
- complaints
- migration to an other competitor company

– Revenue

- no on-line transaction
- revenue reduction

Frequent service downs and no immediate action in major domestic portal sites increase customers' dissatisfaction.

Electronic Times 2003/3/4

Effects of network-down

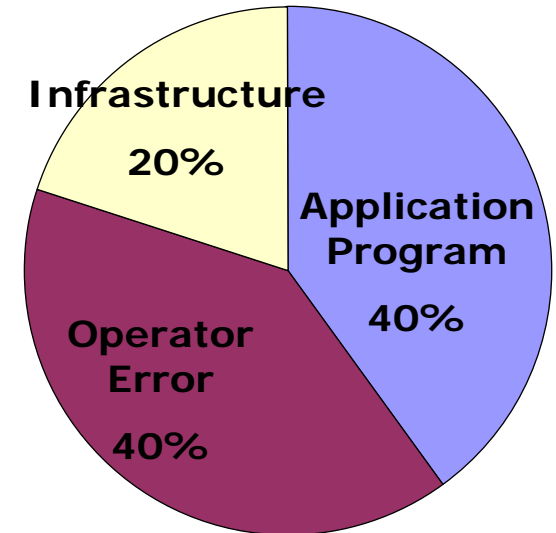
An example of small to medium size IT company

: in case network goes down twice a month and it lasts one hour on every single downtime (0.3% downtime)

IT opportunity cost	Number of employees	25
	IT burdened labor rate (\$/hr)	35
	IT opportunity cost per outage(\$)	875
	IT opportunity cost(\$/yr)	21,000
User productivity	Number of users	500
	Users affected per outage	50
	User burdened labor rate(\$/hr)	35
	Lost user productivity per outage(\$)	1,750
	Lost user productivity(\$/yr)	120,000
Business revenue	Daily server revenue(\$)	120,000
	Lost revenue per outage(\$)	5,000
	Lost Business revenue(\$/yr)	120,000
	Total annual costs(\$)	183,000

Factors and solutions to network-down

factors of network-down	details	solution
Application Program	program bugs	in-band
Operator Error	operator errors	in-band, out-of-band
Infrastructure Failure	power, network hardware, OS	out-of-band



(ref: Gartner)

Necessity of out-of-band management

- in-band management
 - based on data network (LAN or WAN)
 - SNMP basis
 - HP OpenView, IBM Tivoli, BMC Patrol
- out-of-band management
 - direct access to the device' management port
 - **solves 60% of network-down**
 - **only solution to 20% of network-down**

Out-of-band management solutions

solution	details	pros & cons
remote management software	Unix - Telnet,SSH,X-Windows, ...	mainly in-band management under specific UI
	Windows - MS Terminal Service, PC Anywhere, Carbon Copy, ...	
KVM	KVM multiplexer, remote delivery via KVM over IP	not applicable to non-KVM devices, local out-of-band management, high price, bandwidth demanding
embedded type	embedded management toolkit in a device	
serial console port	named as 'COM', 'AUX', 'Console', provides configuration tools/ BIOS/ OS Console/ etc..	universal management port, Accessibility deteriorates as the number of nodes increase.
console server	a device to access multiple console devices with various management features	local/remote control, security functions
application software	software console servers	some are free of charge but hardware is required

Serial console port

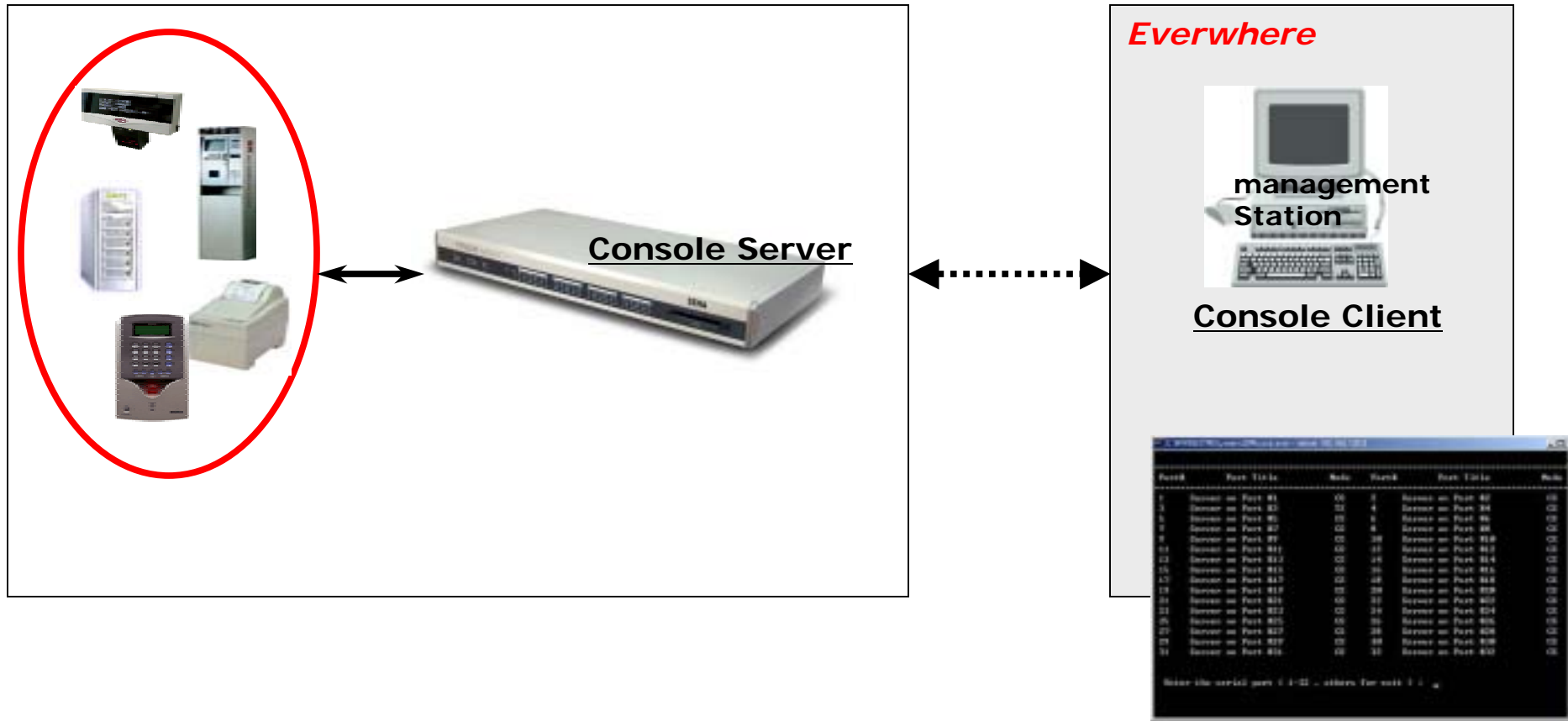
❑ devices with serial console port

- **Unix/Linux server**
- **Windows Server/PC**
- **network device** : router, switch, firewall, gateway, ...
- **power** : UPS, power supply unit, ...
- **telephone** : PBX, switch, ...
- **environmental control** : sensor, HVAC, alarm, actuator, ...

❑ pros. & cons.

- **available in most devices** : universal management port
- **high availability** : available even in network or system error
- **low level control or monitoring** : BIOS, OS level
- **limited accessibility : physical access to a device**
- **difficulty in integrated management : difficult to manage increasing number of devices**

Console server



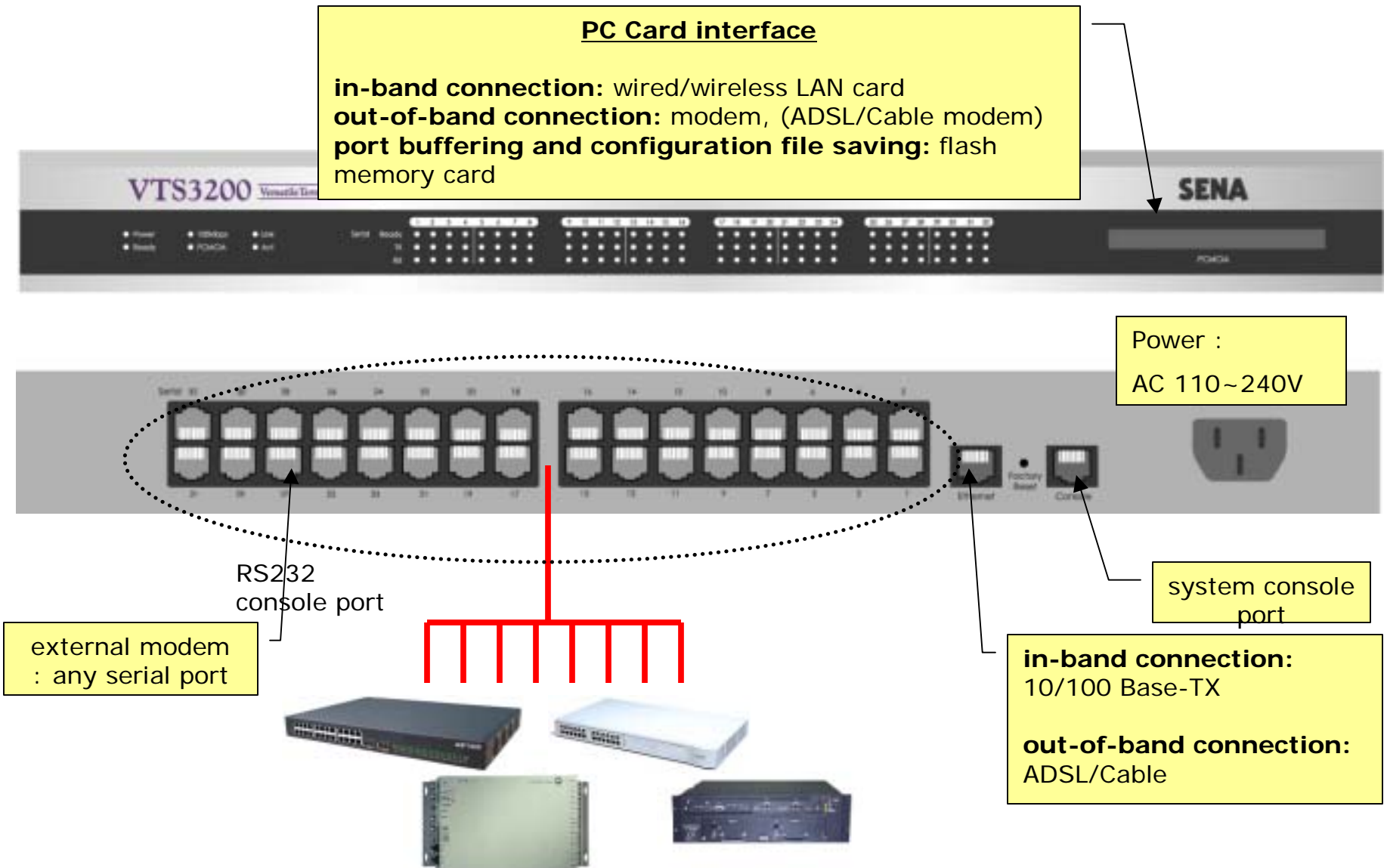
- integrated console management point for different type of devices
- local/remote accessibility via various bands
- management features
- security features

VTS Overview

- ❑ **Remote management over IT/Telco equipments**
 - ❑ in-band connection via LAN or wireless LAN
 - ❑ out-of-band connection via dial-up(PSTN) or broadband (ADSL/Cable)
- ❑ **Easy user interface**
 - ❑ menu-based (system console/telnet/Web)
 - ❑ Linux shell based (system console/telnet)
- ❑ **Port function**
 - ❑ port buffering (memory/ATA flash card/NFS/Syslog) and port sniffing
 - ❑ multiple Java applets for port access on Web
- ❑ **Various PCCard support**
 - ❑ storage: ATA flash
 - ❑ connection: wired/wireless LAN, PSTN modem
- ❑ **Security**
 - ❑ Authentication: SSH v1&v2, RADIUS, LDAP, TACACS+, (Kerberos)
 - ❑ different user level: root, admin, port admin, user
 - ❑ user access control per port
 - ❑ IP filtering

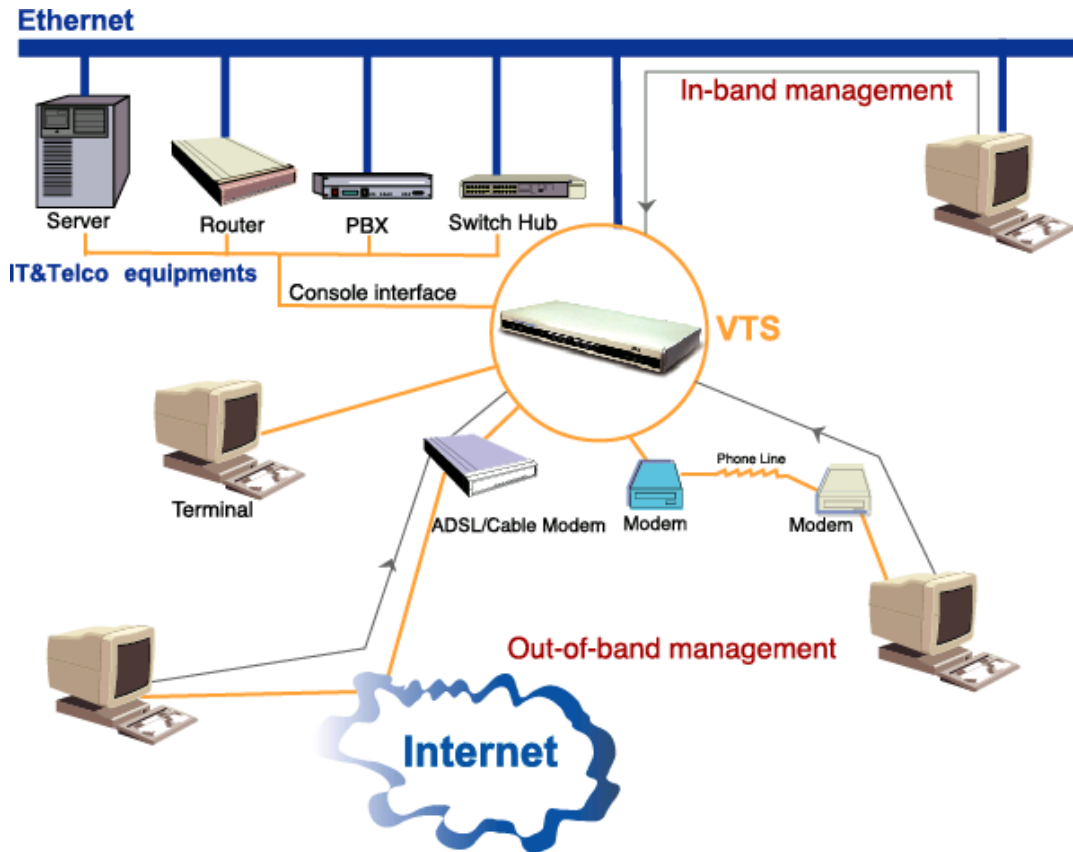


VTS Overview: Exterior view

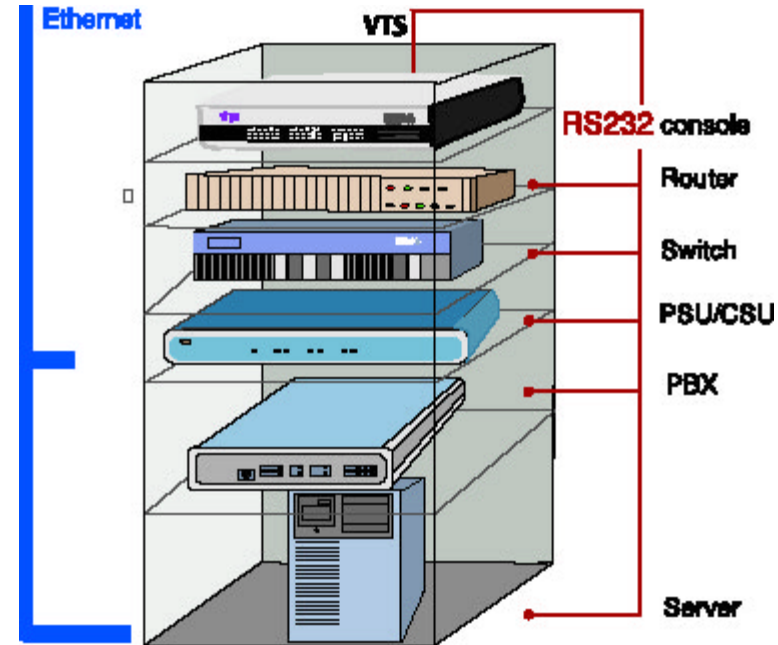


VTS Overview: Operation & Installation

Operation diagram



Installation diagram



VTS Features: Easy configuration

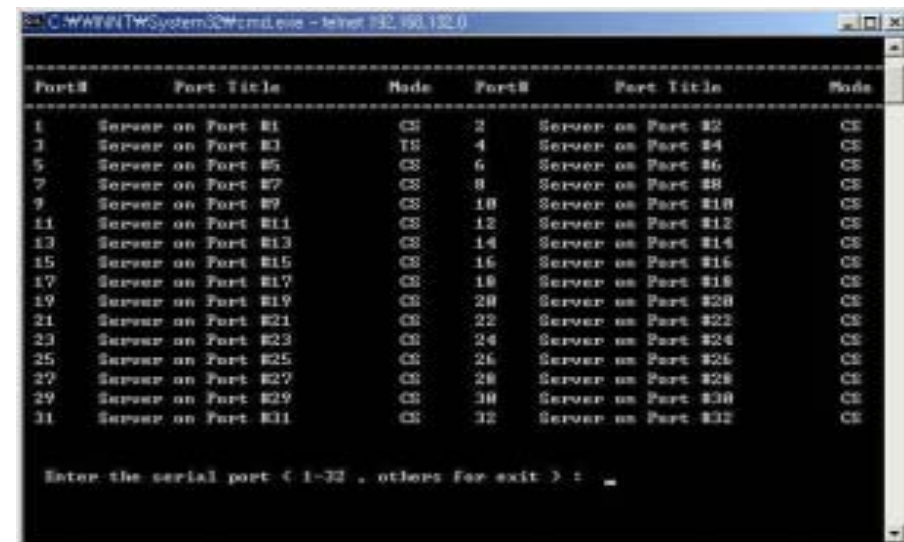
□ GUI based

- Web
- hierarchical menu configuration

Easy & fast configure
within 10 mins for basic configurations!

□ Text based

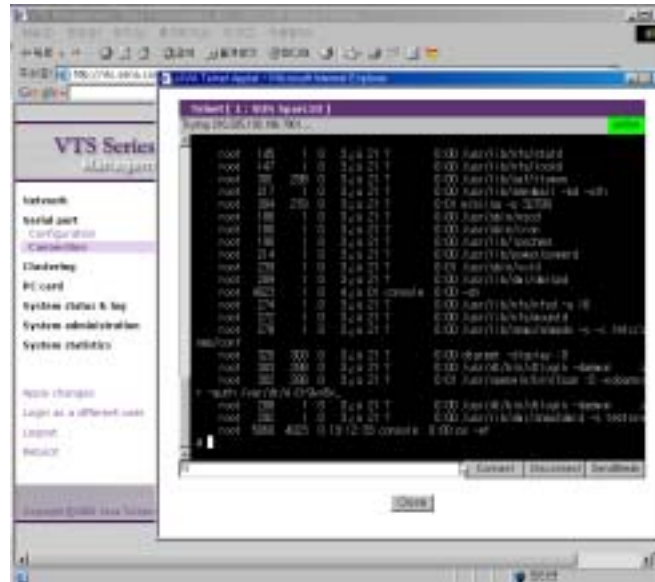
- Telnet, SSH
- VTS serial console



VTS Features: Easy port access

❑ Accessing methods

- any telnet/SSH client program
- telnet/SSH Java applet embedded in VTS Web page






❑ Simultaneous access of multiple users

- bilateral monitoring of each others activity on a device
- on-line messaging between managers on a device

VTS Features: Easy & direct cabling

- ❑ Cisco devices and Sun Netra server are connected using standard Ethernet straight cable!

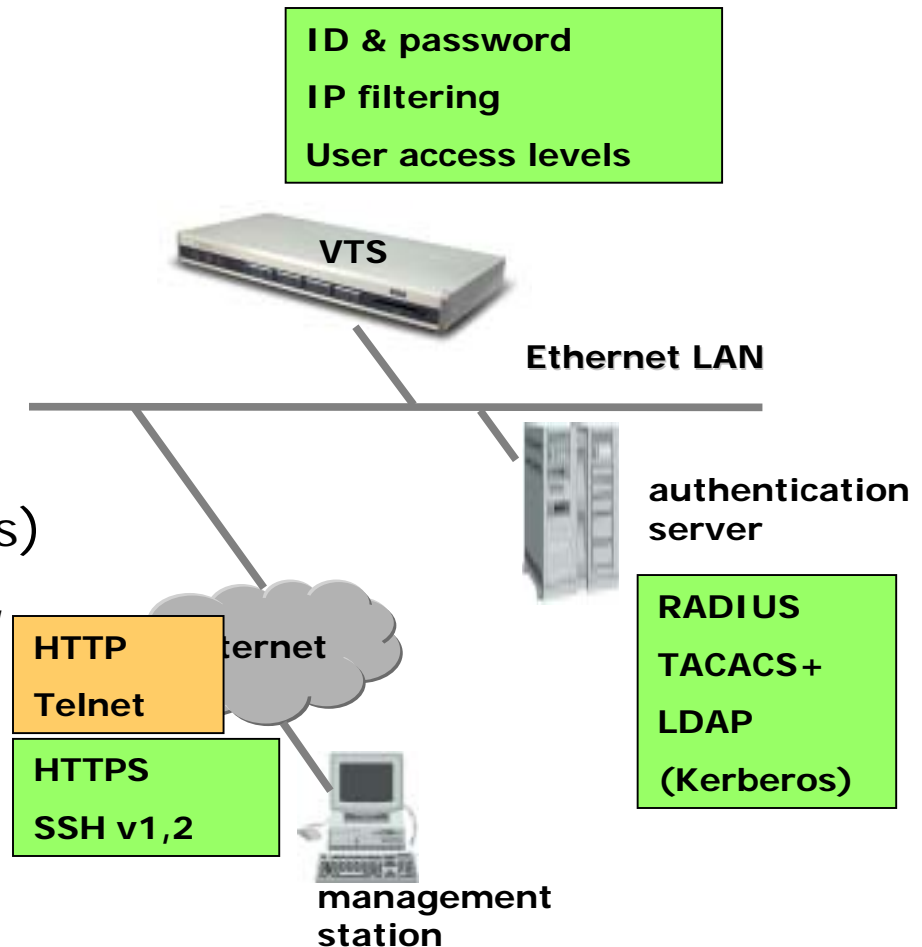
Devices	Serial port type	Use
Cisco equipments  Sun Netra servers 	RJ45	Ethernet cable
Nortel equipments Other DB9 DTE devices	DB9 male	Ethernet cable + RJ45-DB9F cross-over adapter
Sun Sparc servers  Other DB25 DTE devices	DB25 female	Ethernet cable + RJ45-DB25M cross-over adapter
Serial printers DB25 DTE devices	DB25 male	Ethernet cable + RJ45-DB25F cross-over adapter
Modem ISDN terminal adapters	DB25 male	Ethernet cable + RJ45-DB25M straight adapter

VTS Features: Various connectivity

- ❑ Various alternate connections: out-of-band
 - PSTN
 - external modem
 - PCCard modem
 - DSL : broadband internet service
 - external modem
 - Wireless : 802.11d
 - PCMCIA wireless LAN card
 - Serial console
 - built-in VTS system console port

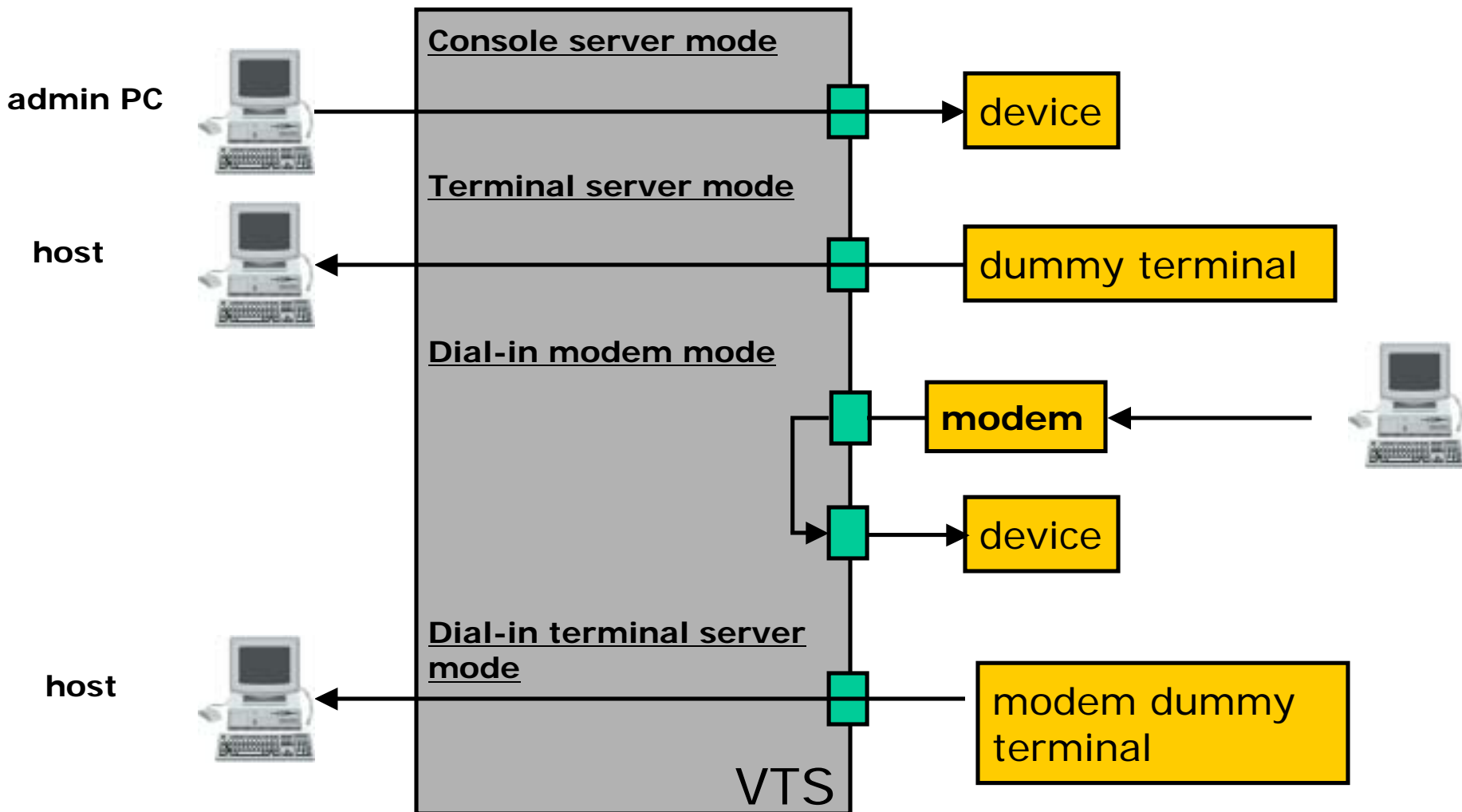
VTS Features: Security

- ❑ Data encryption
 - SSH v1,2
 - HTTPS
- ❑ User authentication
 - local
 - authentication server
- ❑ IP filtering (firewall function)
- ❑ User groups (different privileges)
root, system admin, port admin, user
- ❑ User access control per port
 - allowed/restricted user list
 - Sniff mode user list



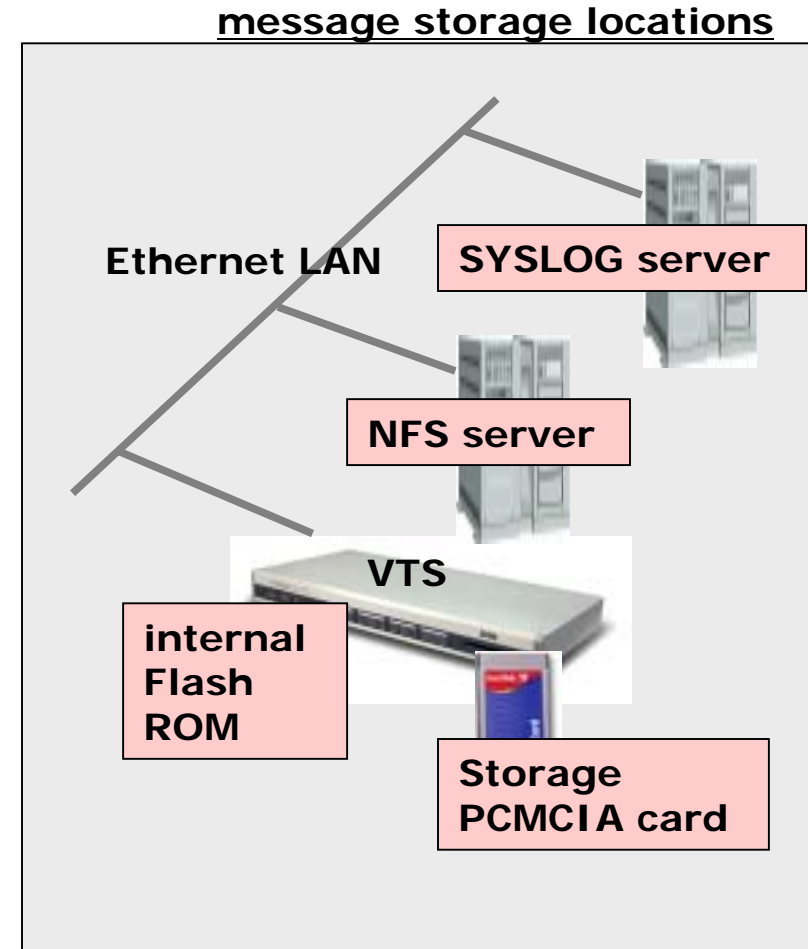
VTS Features: Various port modes

four port modes:



VTS Features: Various message storing

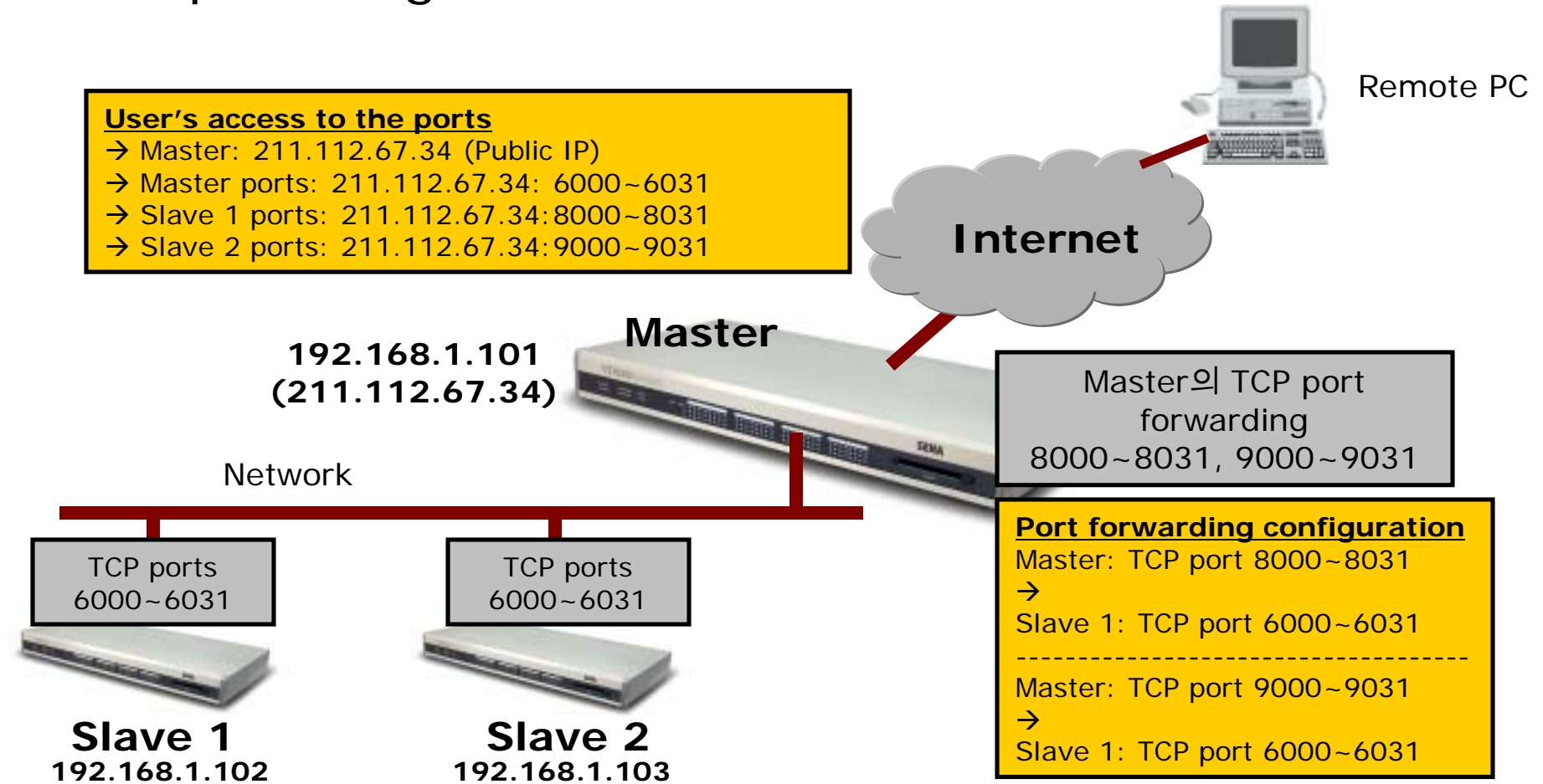
- ❑ message storage locations
 - internal flash memory
 - PCMCIA storage card
 - external Syslog server
 - external NFS server
- ❑ usage of stored messages
 - operational trends of a device
 - device forensics
- ❑ alarming
 - keyword monitoring
 - alarm (email, SNMP trap)
- ❑ actions
 - immediate action to an event
 - periodic job scheduling



- ❑ Users
 - add/delete/adjust privileges
 - user control on port basis
- ❑ Save system messages and alarm
- ❑ Statistics
 - network, ports, users, ...
- ❑ Firmware upgrade
 - web
 - telnet, serial console

VTS Features: Clustering

- ❑ One Master VTS accommodates 16 slave VTSes. : save precious public IPs
- ❑ No speed degradation



VTS Features: Various PCCard support

Ethernet

Manufacturer	Model/Name	VTS probed Model name	Specification
3COM	3CXE589ET-AP	3Com Megahertz 589E TP/BNC LAN PC Card	10 Mbps LAN card
LinkSys	EtherFast PCM100	LinkSys EtherFast PCM100 LAN PC Card	10/100 Mbps LAN card

ATA Flash

Manufacturer	Model/Name	VTS probed Model name	Specification
Advantech	CompactFlash	CF 48M	48 MB Flash card
SanDisk	SDP series	SunDisk SDP 5/3 0.6	64 MB Flash card
Kingston	CompactFlash Storage Card	TOSHIBA THNCF064MAA	64 MB Flash card
Viking	CompactFlash	TOSHIBA THNCF064MBA	64 MB Flash card

Wireless LAN

Manufacturer	Model/Name	VTS probed Model name	Specification
Disco Systems	AIR-PCM340/Aironet 340	Cisco Systems 340 Series Wireless LAN Adapter	11 Mbps Wireless LAN Adapter

Modem

Manufacturer	Model/Name	VTS probed Model name	Specification
Billionton Systems Inc.	FM56C series	PCMCIA CARD 56KFaxModem FM56C-NFS 5.41	Ambient (Intel) V.90 FAX/MODEM PC Card
Viking	PC Card Modem 56K	Viking V.90 K56flex 021 A	MODEM PC Card
KINGMAX	KIT PCMCIA 56K Fax/Modem Card	CIRRUS LOGIC 56K MODEM CL-MD56XX 5.41	V.90 FAX/MODEM PC Card

VTS Features: Flexible platform

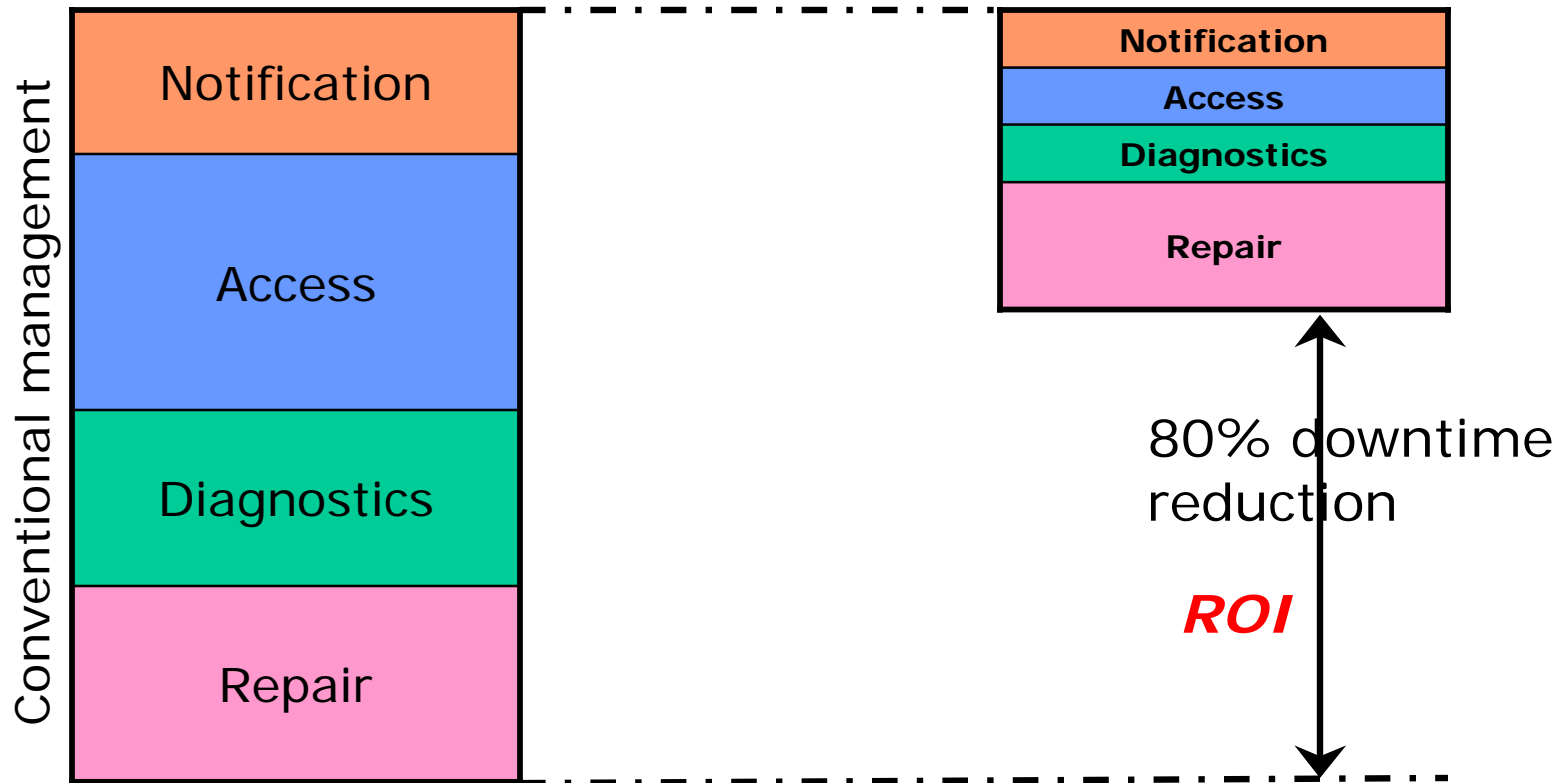
- ❑ Open code base (Linux + 32-bit CPU)
 - Scalability
 - Stability

- ❑ User codes and scripts

Add your value to VTS !

VTS Benefits: Maximize uptime

- Increased uptime



If the management operations include remote, unmanned or isolated site you could expect more ROI.

VTS Benefits: Return On Investment

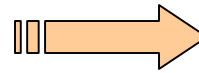
investment to manage 64 devices via VTS:
\$5,000 (\$78 per port)

network downtime

monthly downtime	2
average downtime duration(hr)	1
total downtime (hr/yr)	24

annual cost

(\$183,000)



saved network downtime

each downtime reduction(min)	48
downtime reduction rate(%)	80

investment

(\$5,000)

cost savings

(\$146,400)

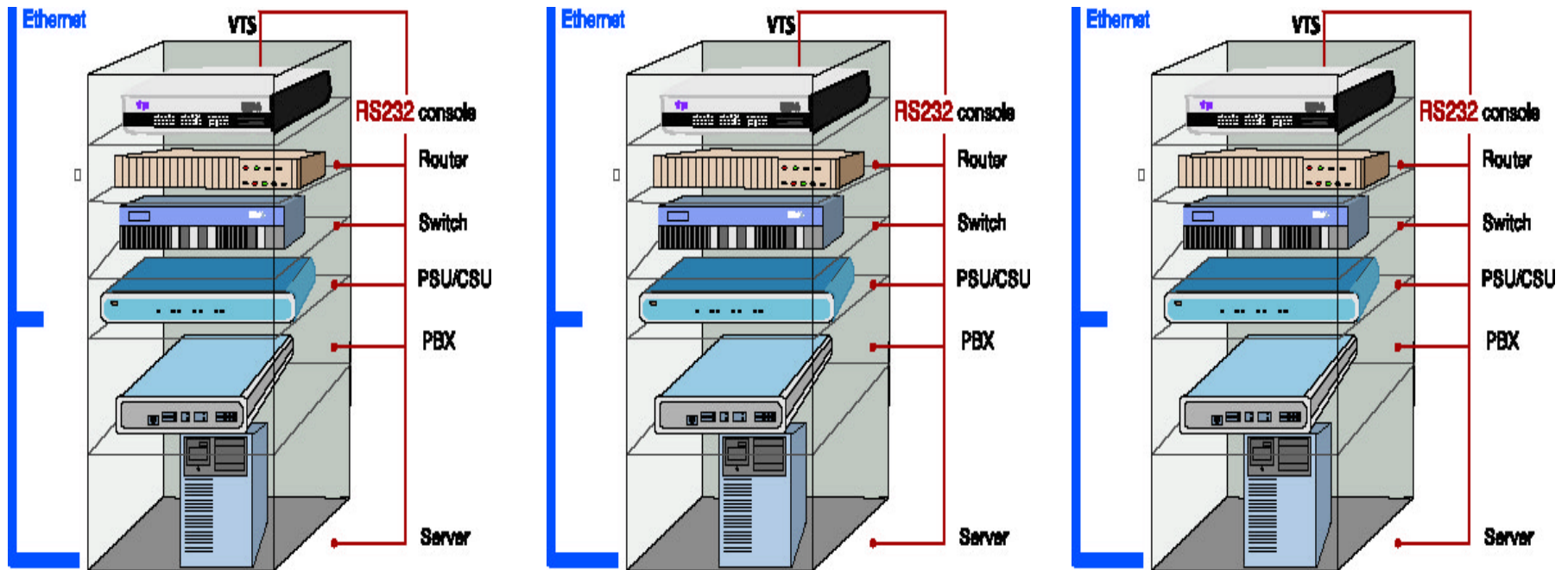
yearly savings(\$)	146,400
investment(\$)	6,000
ROI	2,440%

(refer to "effects of network downtime" for details)

VTS Applications: IDC

□ IDC

- target device: server, router, switch, ...
- management via VTS: convenient management toolbox for different types of devices



VTS Applications: Telecom

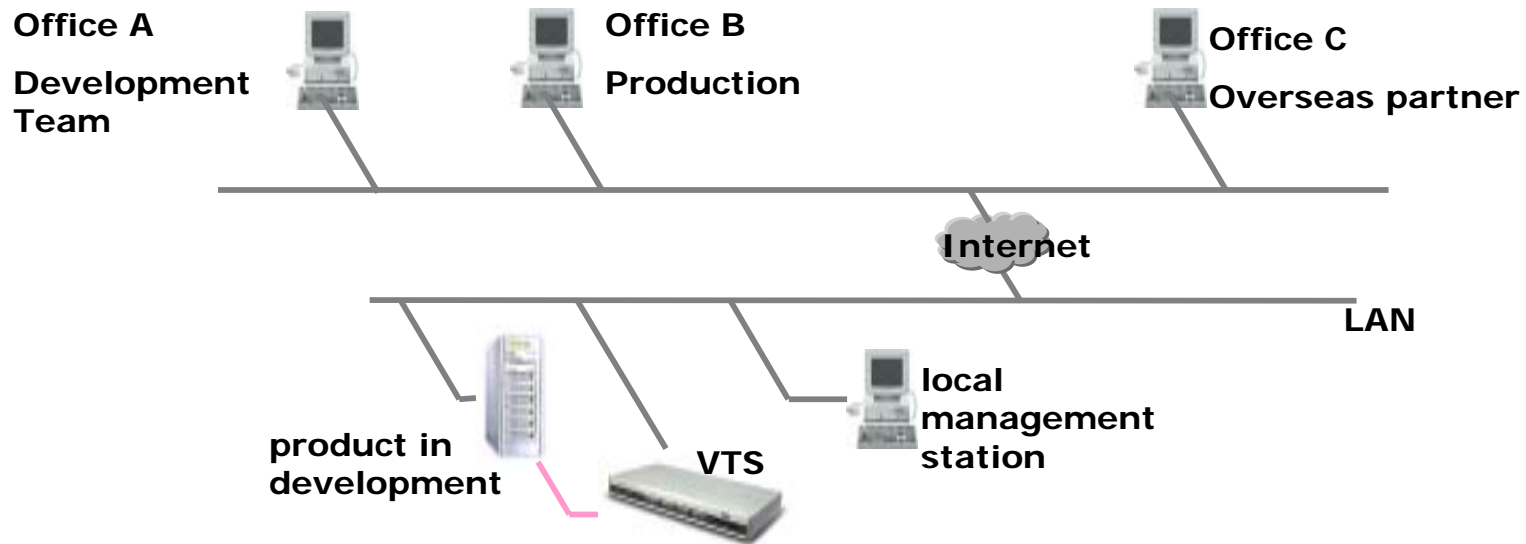
□ Telecom

- target device: CSU/DSU
- before VTS: on site management using a PC and serial multi-port card
- after VTS: centralized management of devices on different locations



❑ Unix server manufacturer

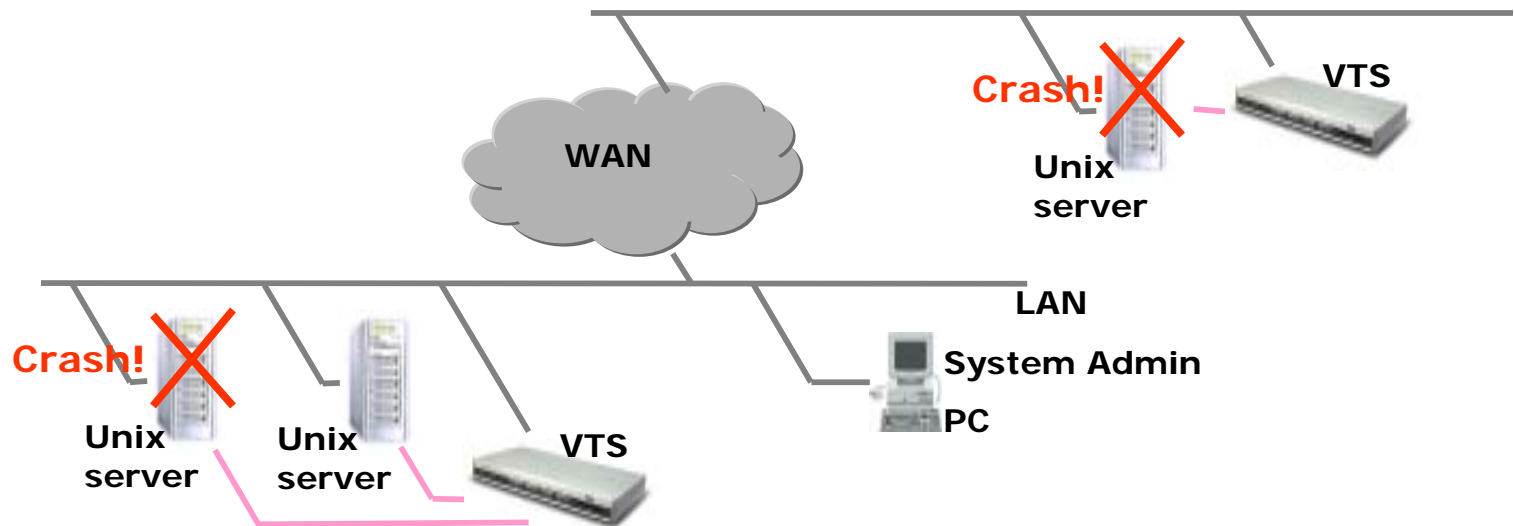
- target device: Unix server
- VTS is utilized in product development and testing: Different people from distributed locations access Unix servers.



VTS Application: IT company

□ IT company

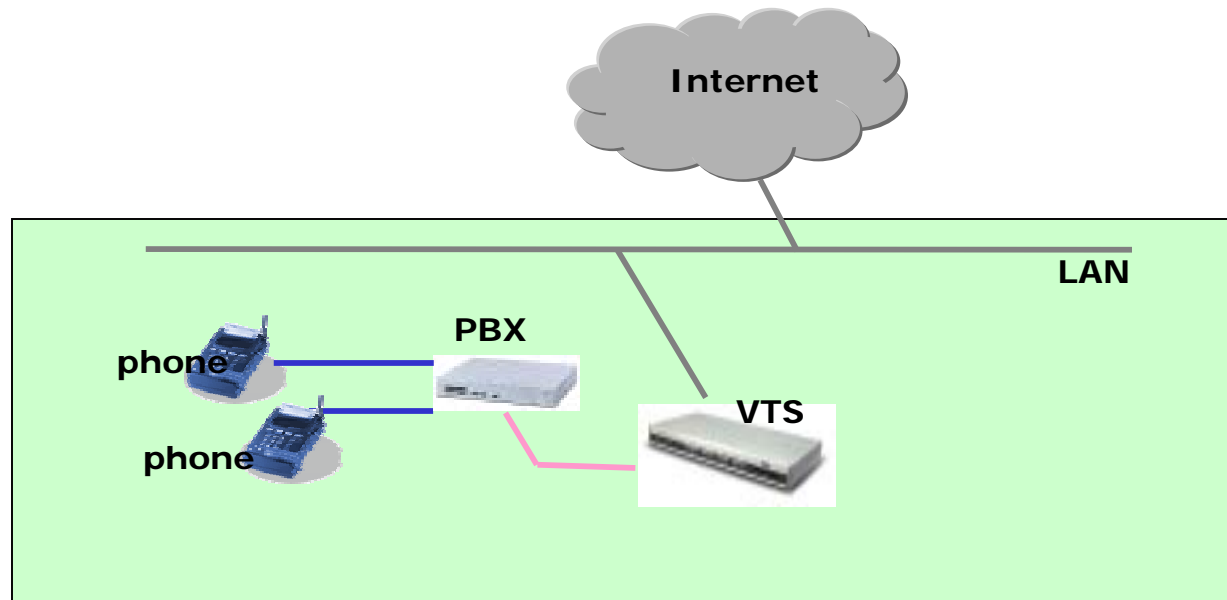
- target device: server
- before VTS: SNMP->could not reboot a crashed server or access the server. An administrator needed to access the server in person.
- after VTS: no need to physically access the crash site



VTS Application: Company phone system

□ Company phone system

- target device: PBX
- before VTS: high maintenance costs due to modem line and physical access
- after VTS: remote maintenance. convenient and cost-effective management



VTS Review

VTS cause

- maximize server and network uptime

VTS target device

- server
- network devices
- automation devices

VTS user

- Corporate/Telco/IDC network administrator, Telco device administrator
- production and development engineer of console devices

VTS features

- detection and notification of server down
- proactive reaction and information storage to device' malfunction
- Solution to network downtime

VTS competitiveness

- device independent platform that enables local/remote connection when network is down
- Linux flexibility and facile customization