RECOL®
*High Performance Internet*

**Building Virtual Private Networks with RECOL Services**
**by Jacob Epstein, CTO**
**November 18, 2001**

RECOL offers a suite of services that support the linking of remote users via Virtual Private Network (VPN) technology. This paper and attached diagram outline several scenarios that can be utilized to link remote systems.

A VPN accomplishes three tasks:

1. It encrypts data between endpoints.
2. It provides a secure mechanism for authenticating access to the VPN.
3. It routes and manages the flow of data between the endpoints.

As such, the VPN enables an organization to securely extend its internal data and resources to remote users via the Internet. This eliminates the need for dedicated communications hardware and services between sites thus simplifying implementation and lowering costs.

A VPN is said to work at the network level. This means that once in place, those applications that function on a Local Area Network, LAN, also operate over VPNs with little or no change. However, speed and other factors such as security (i.e. managing access) can impact operations. Internet aware applications are also an option for developing remote processing using the Internet. Examples of these include WEB sites, and thin client technologies notably Microsoft and Citrix Terminal Services.

A VPN can be implemented via hardware, software and hybrid solutions.

1. Hardware – Specialized hardware devices or VPN software on firewalls are added to the network.
2. Server – Windows NT and 2000 and Unix/Linux OS provide VPN Support
3. Client Software – Built-in or 3rd party applications.

Turning to the diagram, solutions such as VPN hardware to VPN hardware and VPN Client software to VPN Hardware are shown. Actual implementations will consider the following issues:

1. Equipment and installation costs.
2. Recurring costs
3. Application requirements
4. Performance (Line and Encryption speed and requirements)
5. Operations and management issues. (ex. Hardware to Hardware requires minimal support on work stations.)

RECOL does not implement hardware and software solutions at customer sites. Instead it works with its integration partners and/or customer staff who implement and support VPN solutions. The following solutions are in use by RECOL customers:

1. Nexland (DSL Routers that support Multiple VPN client Sessions.
2. Cisco Pix Firewall and 3000 Series DSL Concentrators.
3. Intel/Shiva VPN solutions.
4. Microsoft Virtual Private Networking
5. Cisco and Netopia router to router tunnels and VPNs
6. Other solutions including products from Sonic Wall, Watch Guard and Net Screen.

RECOL provides a broad range of communications services that support VPN including:

1. DSL (128k/384k and higher)
2. Frame Relay (64k through 1.543 Mbits)
3. ATM (3Mbits and Higher)
4. Point to Point (Up to 1.543 Mbits)
5. ISDN (Multilink) (64k and higher)
6. Dial-Up (Multilink) (56k and Higher)
7. T3 Internet Access (Up to 45Mbits from Internet attached systems)

These services, which are linked via Fast Ethernet, provide high performance support from 56k to beyond 45 Megabits. And as shown via the diagram, VPN's built over various services have direct connections to each other minimizing exposure to the Internet and associated security risks.

RECOL's experience has shown that once a VPN or remote processing implementation is in place, it in most cases becomes critical to the day to day operation of a customer's business. As such, RECOL provides timely support and various services to diagnose and repair problems as quickly as possible. Backup via Dial-Up, ISDN and other leased services are also available especially for central sites that when down impact many or all remote sites.

In conclusion, RECOL, its customers, and their support organizations have implemented a broad range of VPN solutions. By providing multiple communications and support services, customer requirements, implementation schedules and budgets can be accommodated.

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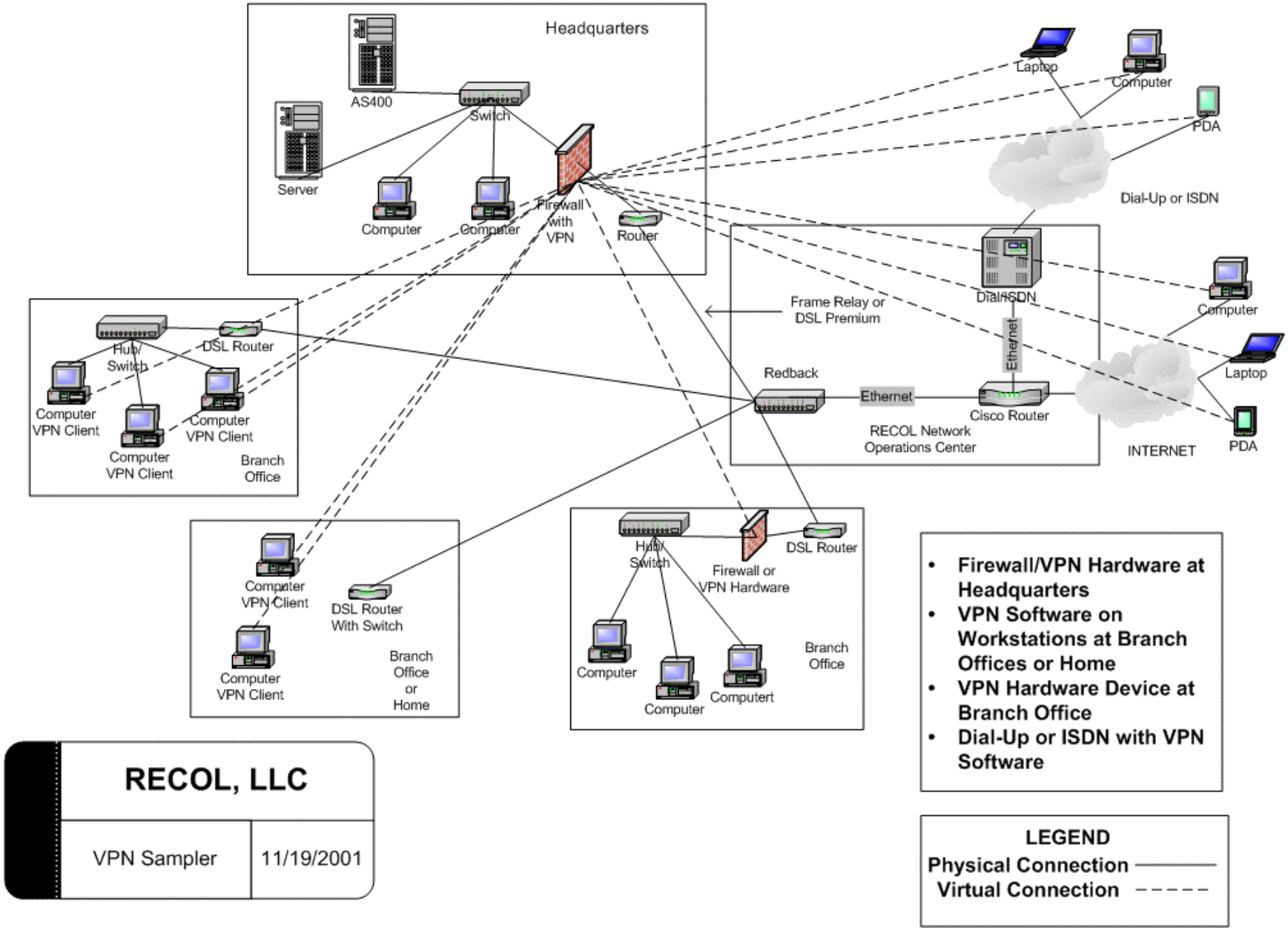
Headquarters
AS400
Switch
Server
Computer
Computer
Firewall with VPN
Router
Laptop
Computer
PDA
Dial-Up or ISDN
Dial/ISDN
Frame Relay or DSL Premium
Ethernet
Redback
Ethernet
Cisco Router
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INTERNET
Computer
Laptop
PDA
Hub/ Switch
DSL Router
Computer VPN Client
Computer VPN Client
Computer VPN Client
Branch Office
Computer VPN Client
DSL Router With Switch
Branch Office or Home
Hub/ Switch
Firewall or VPN Hardware
DSL Router
Computer
Computer
Computert
Branch Office
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VPN Hardware Device at Branch Office
Dial-Up or ISDN with VPN Software
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