DirectAccess:
Anywhere Access for Windows

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DirectAccess
Server and Domain Isolation - protecting internal systems & traffic with IPsec
Network Access Protection (NAP) – end point health assessment, enforcement
General Windows security -Active Directory, smartcards, PKI, hardening, DNSSec

Today’s Agenda

1. Introduction to DirectAccess
2. Technical Introduction
3. Technical Details within Demo
4. Summary

Windows 7

Section 1:

Introduction to DirectAccess

Evolving IT Challenges

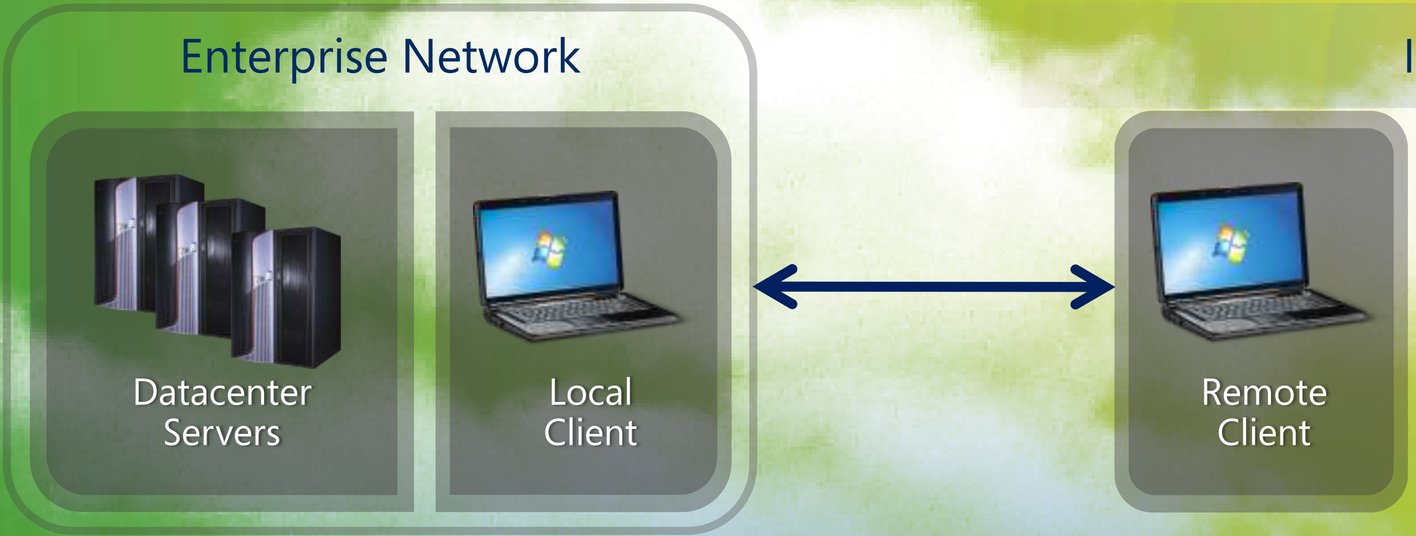
Increasingly Porous Perimeter

Mobile Workforce

Mobile Data

Globalization

Network Access Vision



Enterprise Network

Internet

Datacenter
Servers

Local
Client

Remote
Client

Identity:	Strong authentication required for all users
Authorization:	Computer health is validated or remediated before allowing network access
Protection:	All network transactions are authenticated and encrypted

Policies are based on identity, not on location

DirectAccess

Extending network services
and resources to remote users

DirectAccess:
More than Remote Access

Always On	Manage Out	Access Policies	Protected Transactions
Improved productivity	"Light up" remote clients	Pre-logon health checks and remediation	Supports authenticated transactions
Not user initiated	Decreases patch miss rates	Replaces modal "connect-time" health checks	Supports encrypted transactions
Simplified connectivity	Applies GPOs to remote computers	Full NAP integration	Authentication and encryption mitigate many attacks

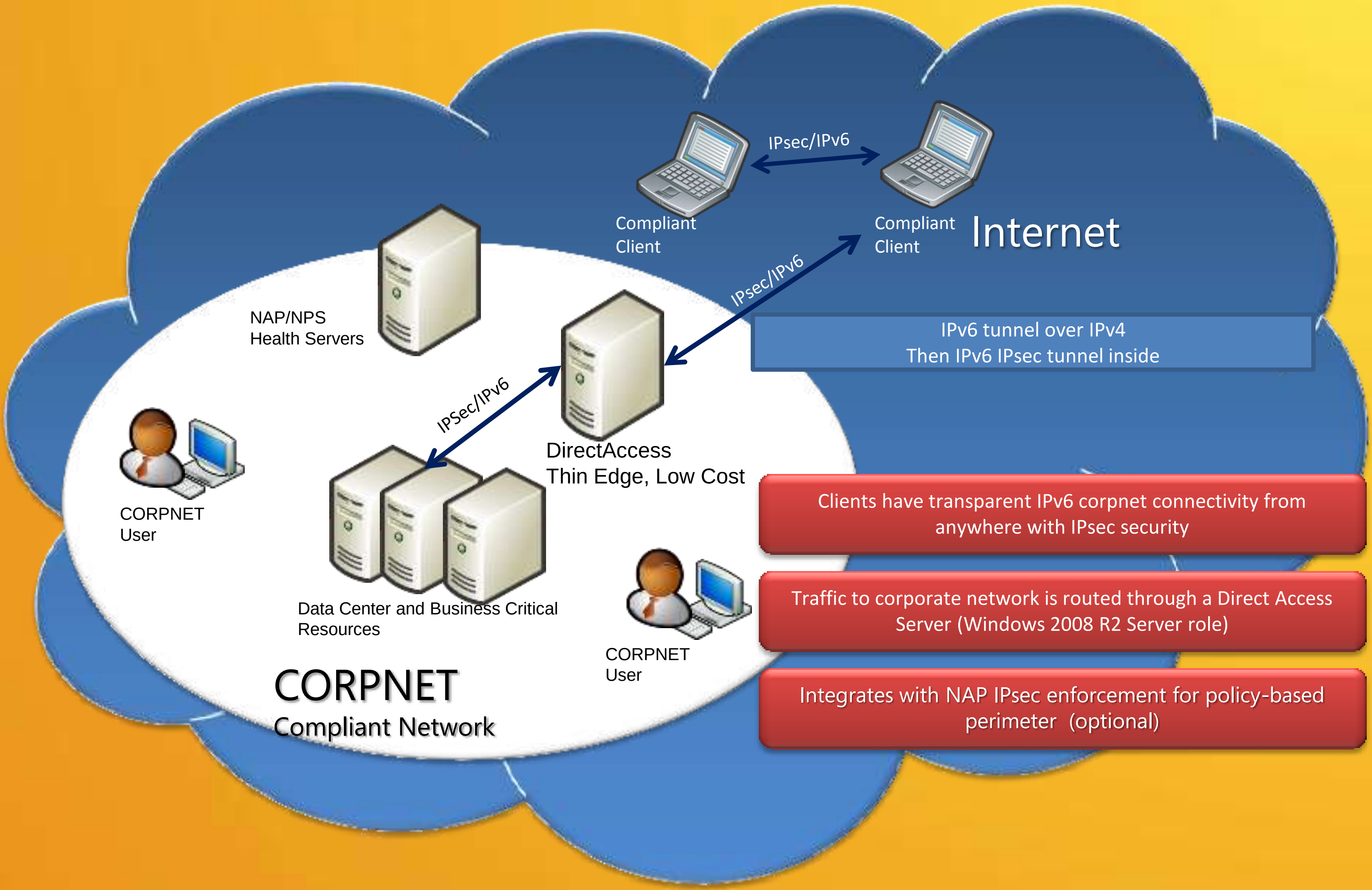
VPNs connect the user to the network

DirectAccess extends the network to the computer and user

Section 2:

Technical Introduction

Solution Overview



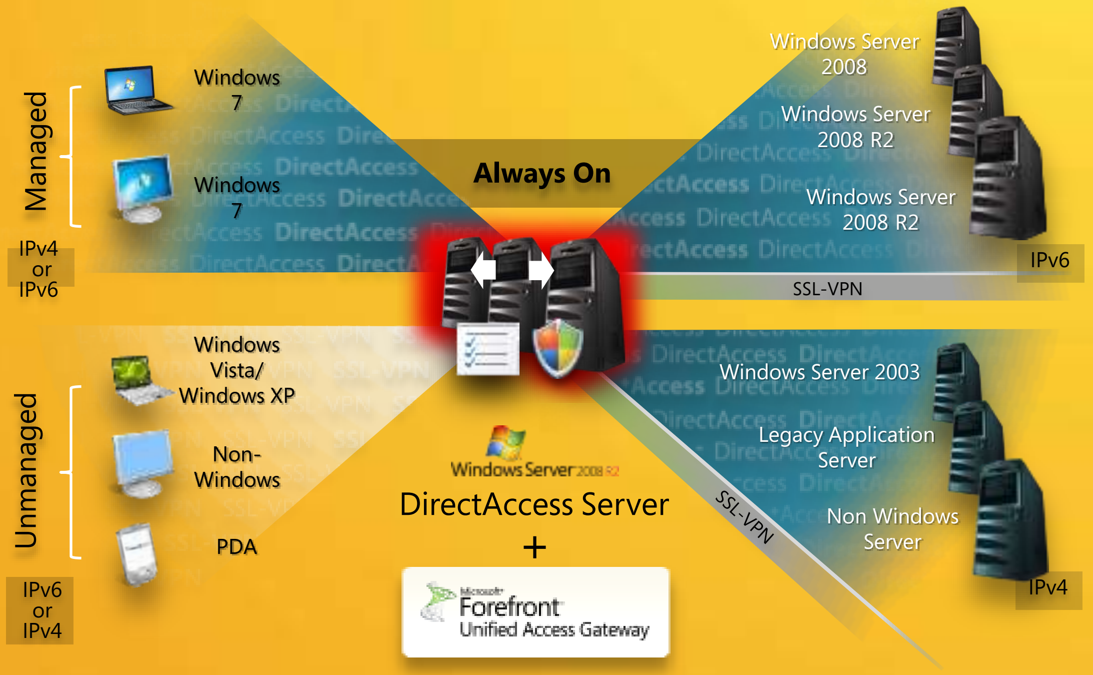
Clients have transparent IPv6 corpnet connectivity from anywhere with IPsec security

Traffic to corporate network is routed through a Direct Access Server (Windows 2008 R2 Server role)

Integrates with NAP IPsec enforcement for policy-based perimeter (optional)

Forefront UAG and DirectAccess:
Better Together

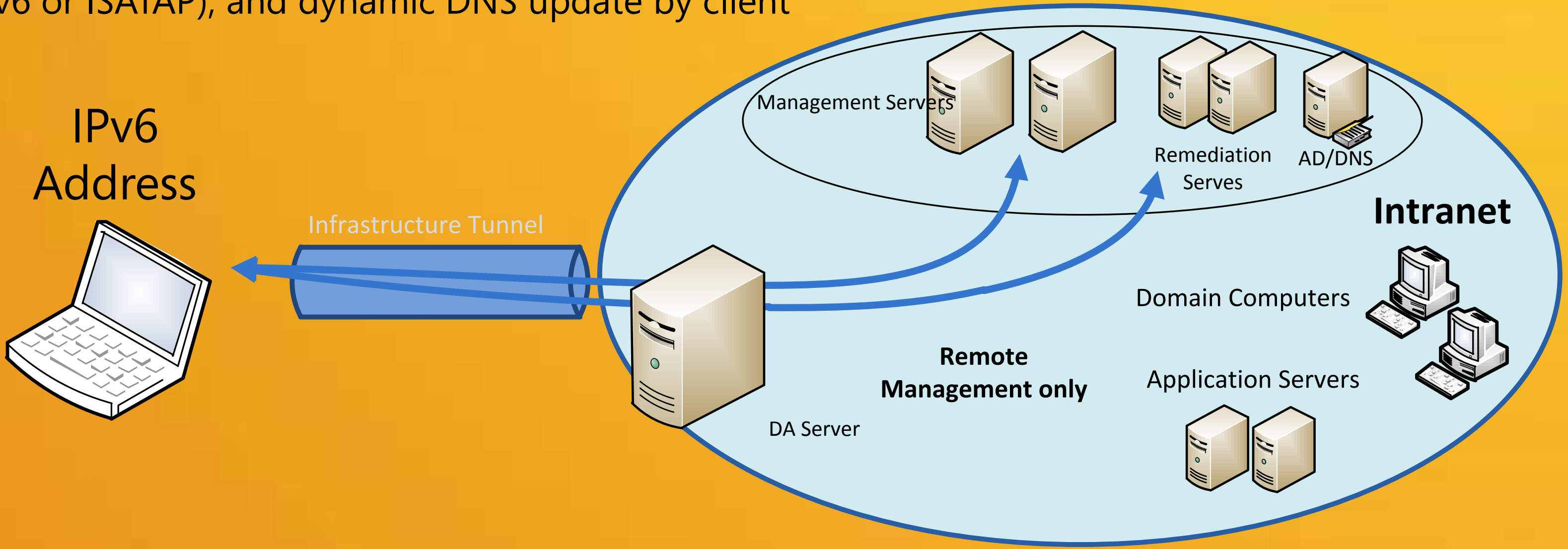
- **Supports many non-DA clients**
- **Enables DA client access to IPv4-only internal hosts with DNS64/NAT64**
- **Enhances DA scalability and management**
  - **High avail, load balancing**
  - **Monitoring, Reports**
- **Provides OTP user auth**
- **Simplifies deployment and administration**
  - **Easy Setup Wizard**
  - **Auto GPO, script gen**
  - **DA Connectivity Assistant**
- **Delivers a hardened, edge-ready solution using Forefront Threat Management Gateway firewall core**



Remote Client Management Only

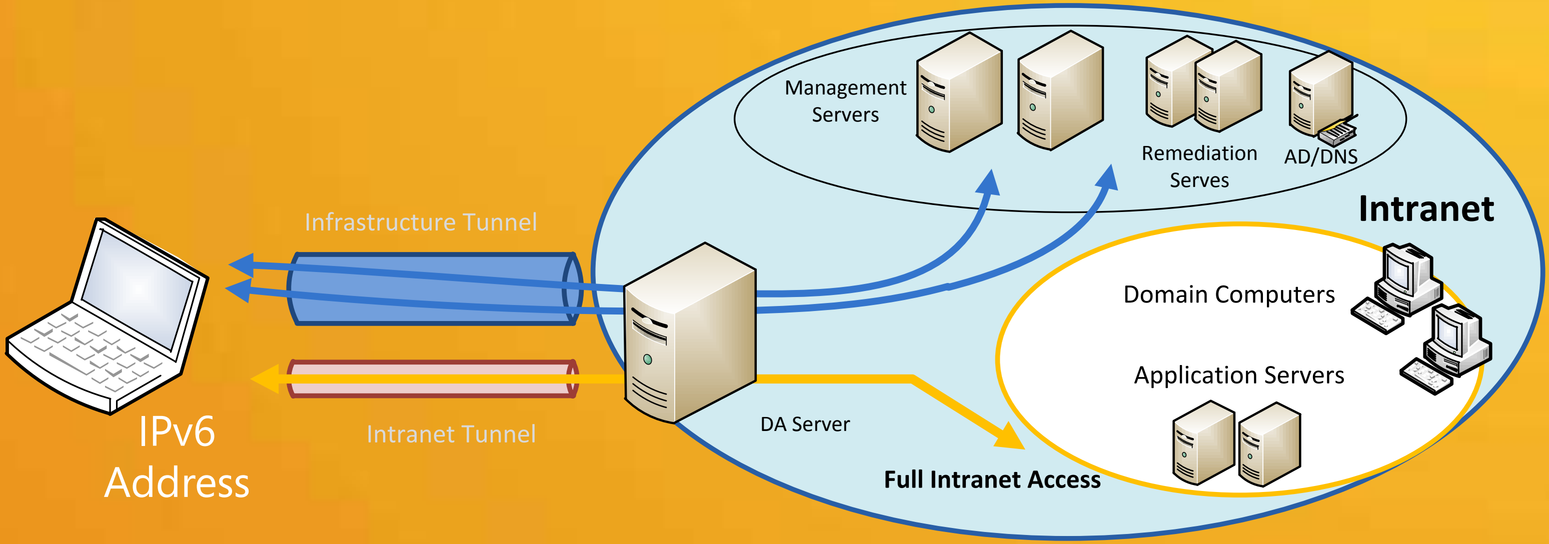
- Only the first IPsec infrastructure tunnel is established. Clients have access only to specific infrastructure servers
- Remote management includes:
  - Active Directory Group Policy, login scripts
  - Pull or push* software updates, AV updates – using same internal mgmt servers
  - Client health checking, reporting and remediation
  - Client monitoring, vulnerability scanning; software inventories
  - Help desk connect out* via Remote Assistance, Remote Desktop

* Internally initiated connections outbound to remote DA client requires IPv6 path (e.g. internal native IPv6 or ISATAP), and dynamic DNS update by client



Selective Access to Full Intranet Access

- Provides client remote management and allows computer and user access to internal resources
  - Infrastructure tunnel for computers
  - Selected servers, prefixes, or full Intranet access
- Different authentication requirements possible:
  - Computer/user domain password (not IKE Preshared Key)
  - Computer/user certificate
  - Computer/user Kerberos
  - User smartcard, OTP (with UAG)



DirectAccess Supporting Technologies

Trusted, authorized machine + compliant (NAP)

Domain Password

Certificate

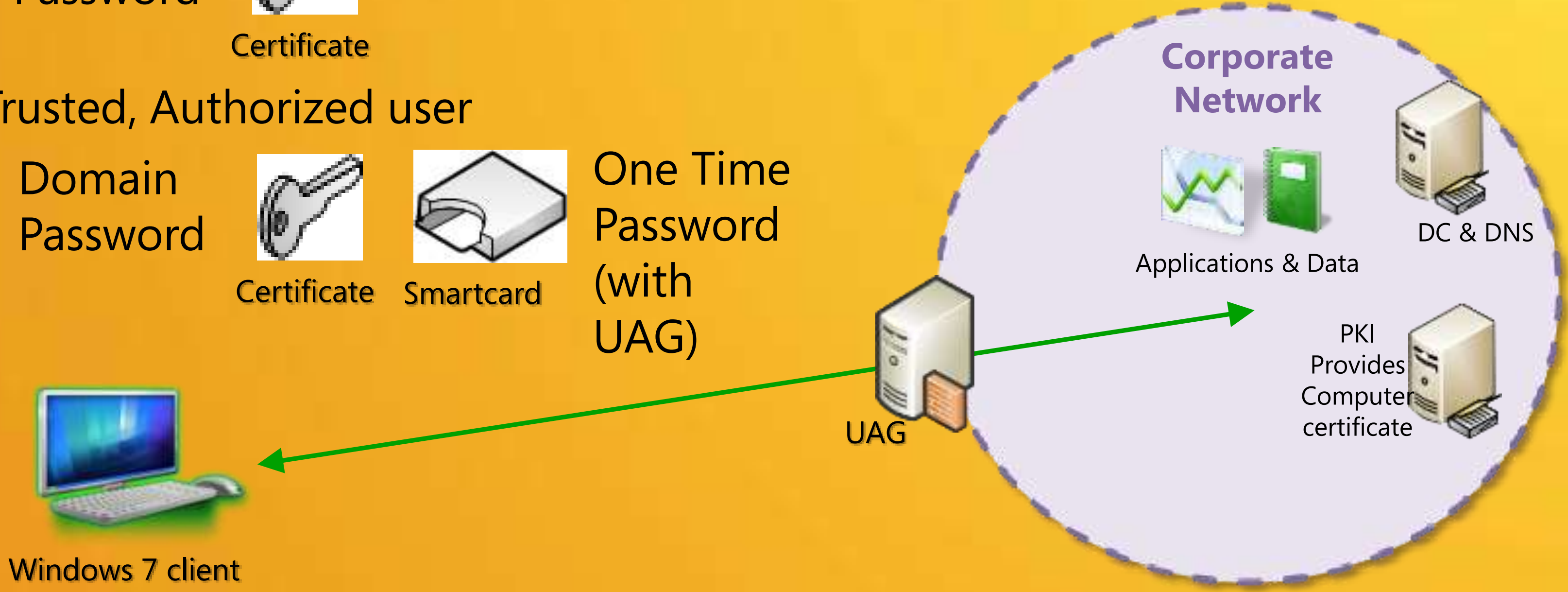
Trusted, Authorized user

Domain Password

Certificate

Smartcard

One Time Password (with UAG)



Windows System Health Agent (SHA)
checks Windows Security Center Status
Custom SHAs available from many 3rd parties

Windows Firewall

Group Policy:
Inside/Outside URL
DNS settings
IPsec policy
Certificate settings

BitLocker + Trusted Platform Module (TPM)

NAP Health Certificate

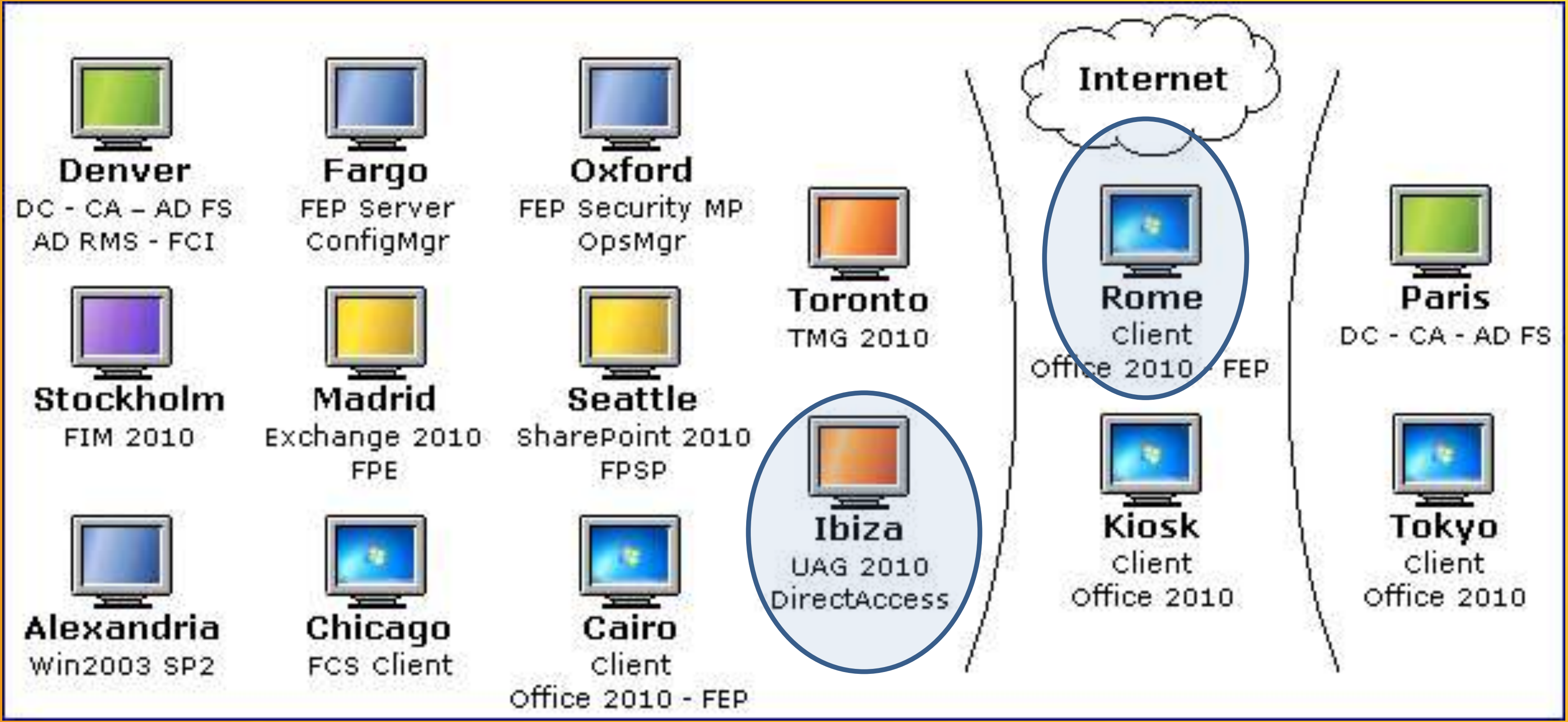
AntiMalware AntiSpyware

Firewall

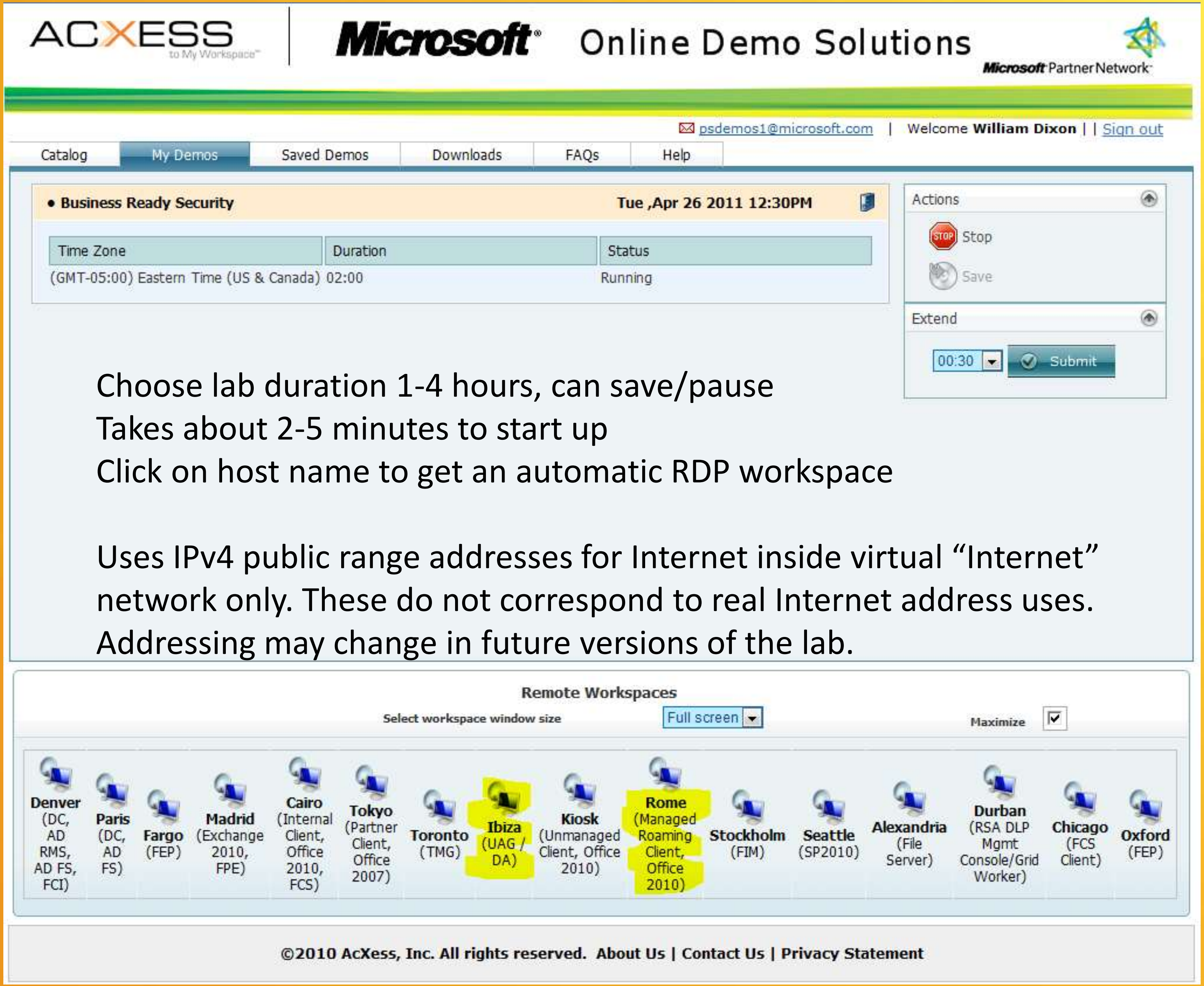
Update Status
e.g. Windows Update,
WSUS, SCCM/SMS Agent

Forefront Business Ready Security Demo

The Forefront Business Ready Security hosted VM demo environment supports a DirectAccess server, a DirectAccess client and an ISATAP enabled internal network



http://www.microsoft.com/forefront/en/us/identity-access-management.aspx



ACXESS to My Workspace | Microsoft Online Demo Solutions

Microsoft Partner Network

psdemos1@microsoft.com | Welcome **William Dixon** | | Sign out

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• Business Ready Security **Tue ,Apr 26 2011 12:30PM**

Time Zone	Duration	Status
(GMT-05:00) Eastern Time (US & Canada)	02:00	Running

Actions

- Stop
- Save

Extend

00:30 Submit

Choose lab duration 1-4 hours, can save/pause
Takes about 2-5 minutes to start up
Click on host name to get an automatic RDP workspace

Uses IPv4 public range addresses for Internet inside virtual “Internet” network only. These do not correspond to real Internet address uses. Addressing may change in future versions of the lab.

Remote Workspaces

Select workspace window size: Full screen

Maximize ☑

- **Denver** (DC, AD RMS, AD FS, FCI)
- **Paris** (DC, AD FS)
- **Fargo** (FEP)
- **Madrid** (Exchange 2010, FPE)
- **Cairo** (Internal Client, Office 2010, FCS)
- **Tokyo** (Partner Client, Office 2007)
- **Toronto** (TMG)
- **Ibiza** (UAG / DA)
- **Kiosk** (Unmanaged Client, Office 2010)
- **Rome** (Managed Roaming Client, Office 2010)
- **Stockholm** (FIM)
- **Seattle** (SP2010)
- **Alexandria** (File Server)
- **Durban** (RSA DLP Mgmt Console/Grid Worker)
- **Chicago** (FCS Client)
- **Oxford** (FEP)

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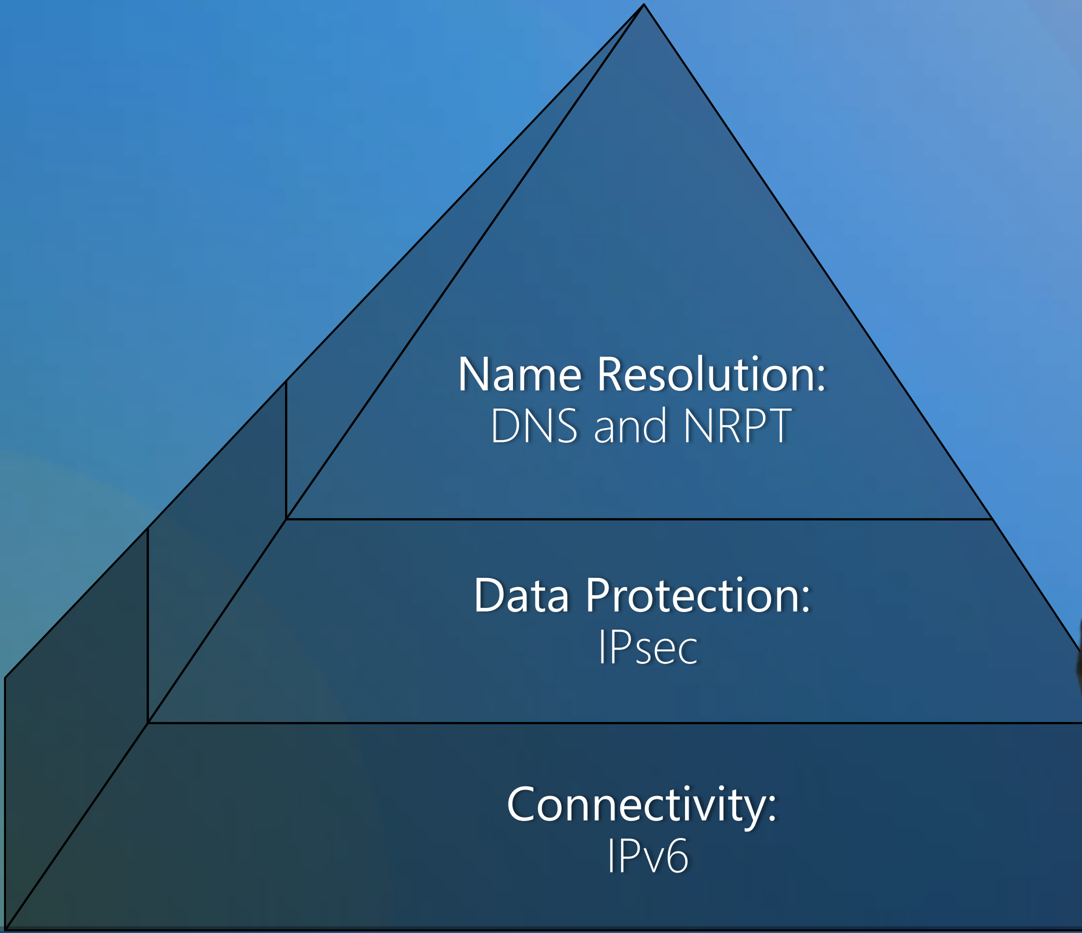
http://mssalesdemos.com

Section 2:

Technical Details

DirectAccess:
Technical Foundation

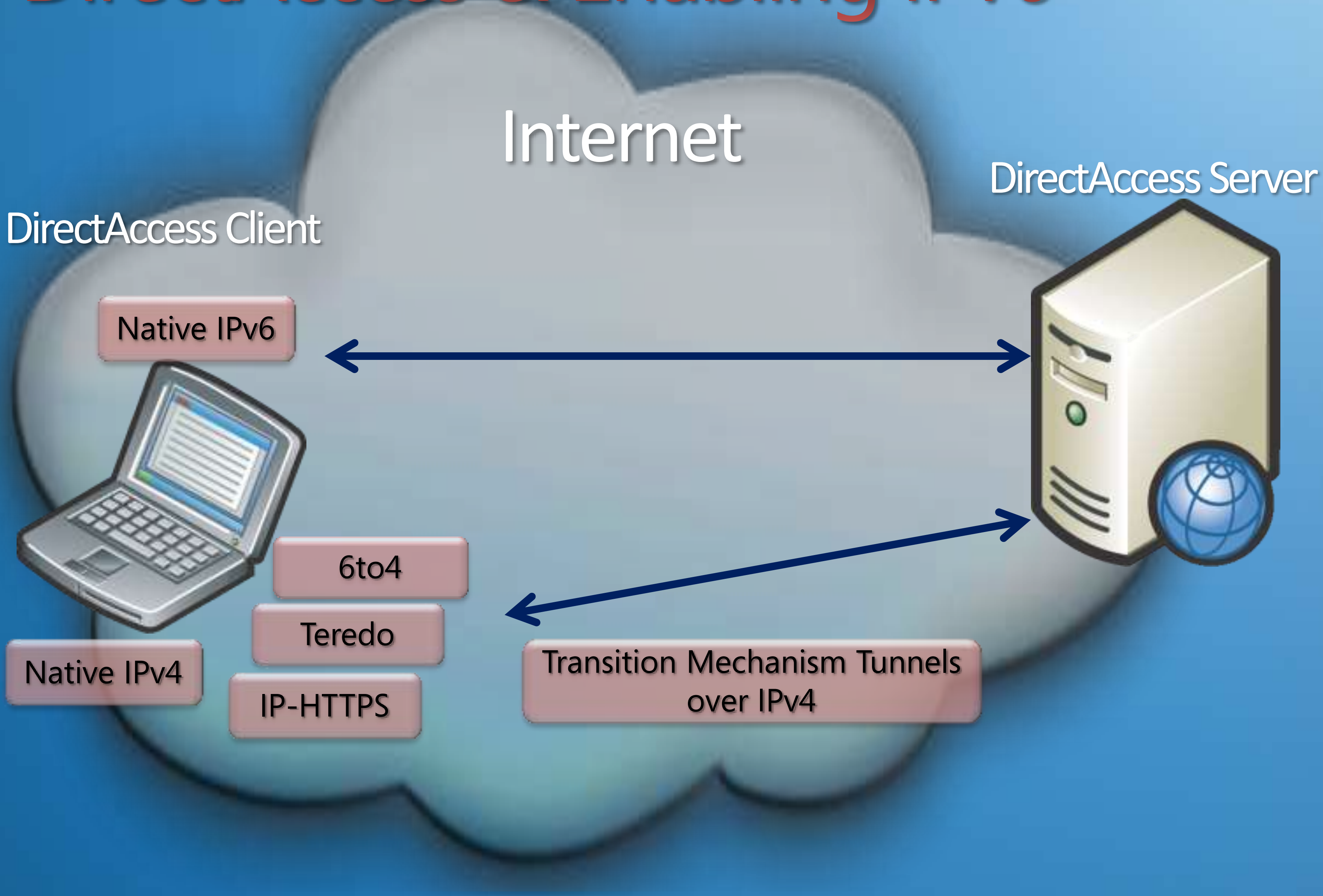


Name Resolution:
DNS and NRPT

Data Protection:
IPsec

Connectivity:
IPv6

DirectAccess & Enabling IPv6



Internal IPv6 Connectivity:

Native IPv6

- Works with any server OS that supports IPv6
- Requires IPv6 network infrastructure
- Delivers best choice over time

ISATAP

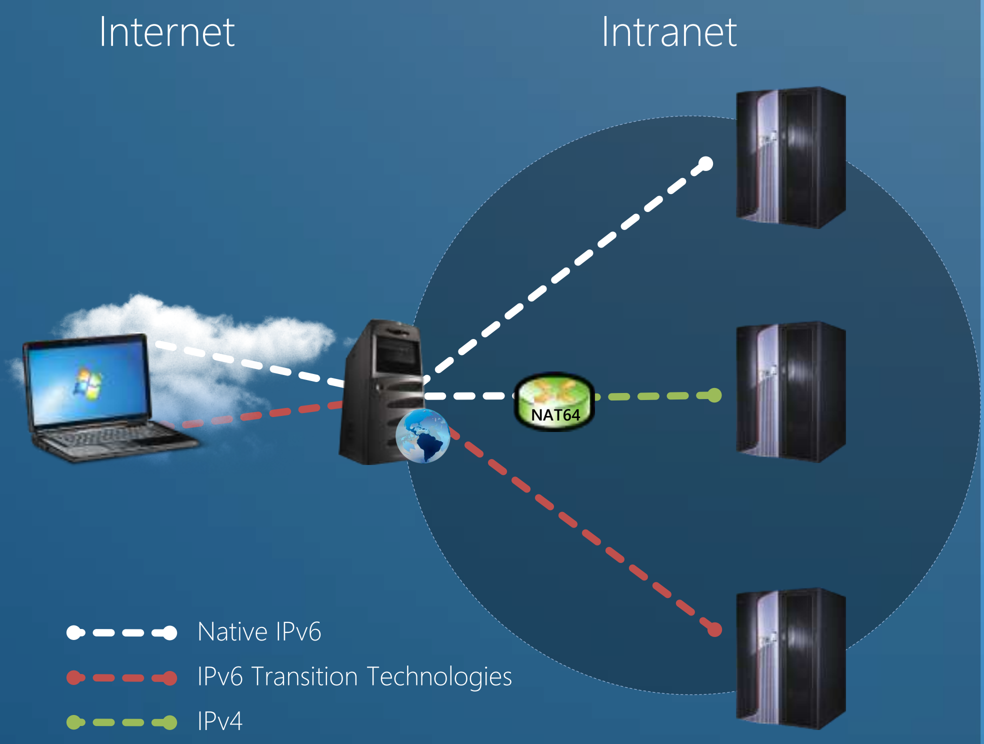
- Tunnels IPv6 inside IPv4
- Doesn't require routing infrastructure upgrades
- Requires Windows Server 2008 or R2

DNS64/NAT64

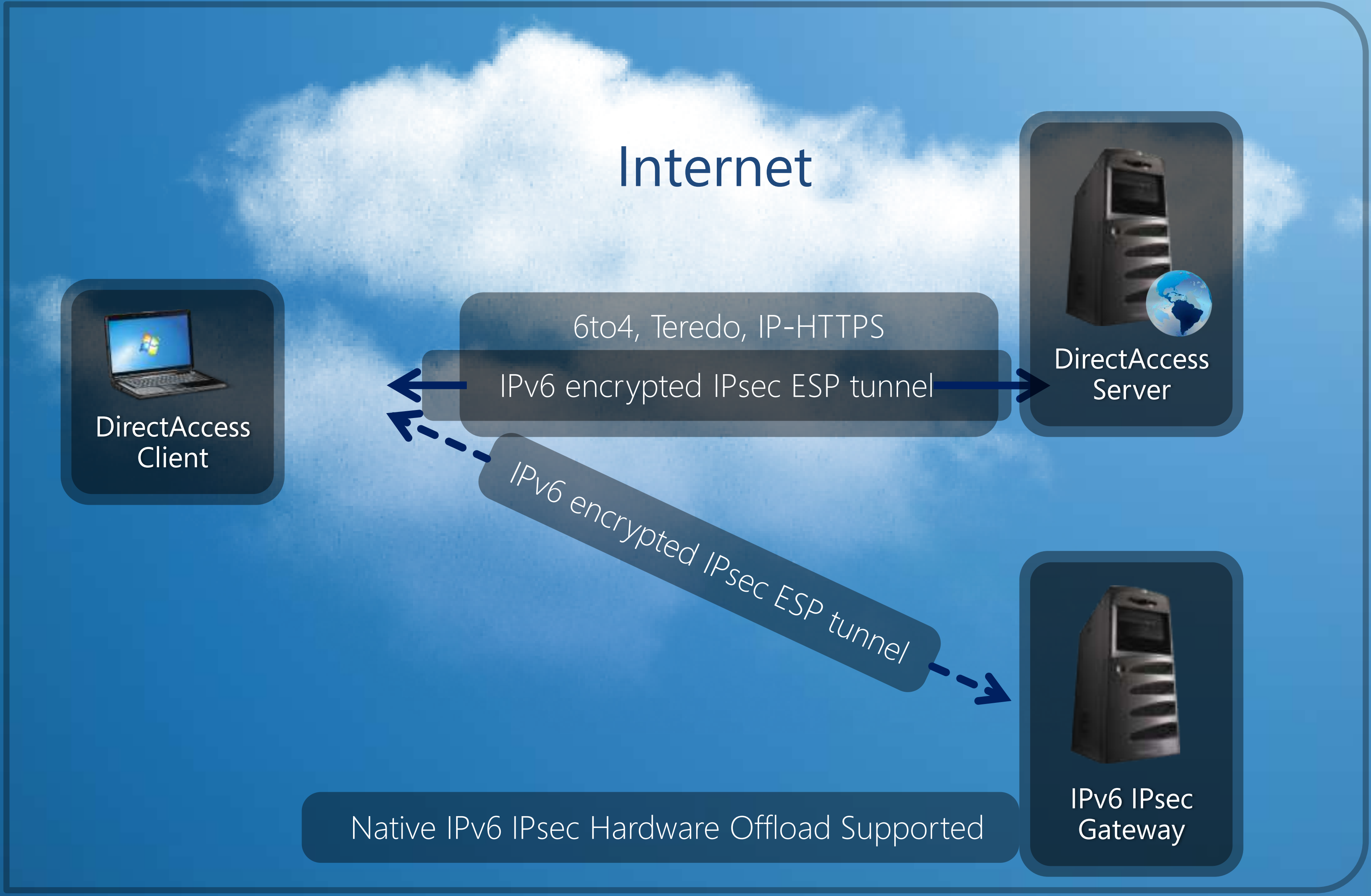
- Translates IPv6 to IPv4
- Works with any server OS
- Is available in Forefront UAG

IPv6 Options

DirectAccess works best if the corporate network has native IPv6 deployed



External IPv6 IPsec


Internet

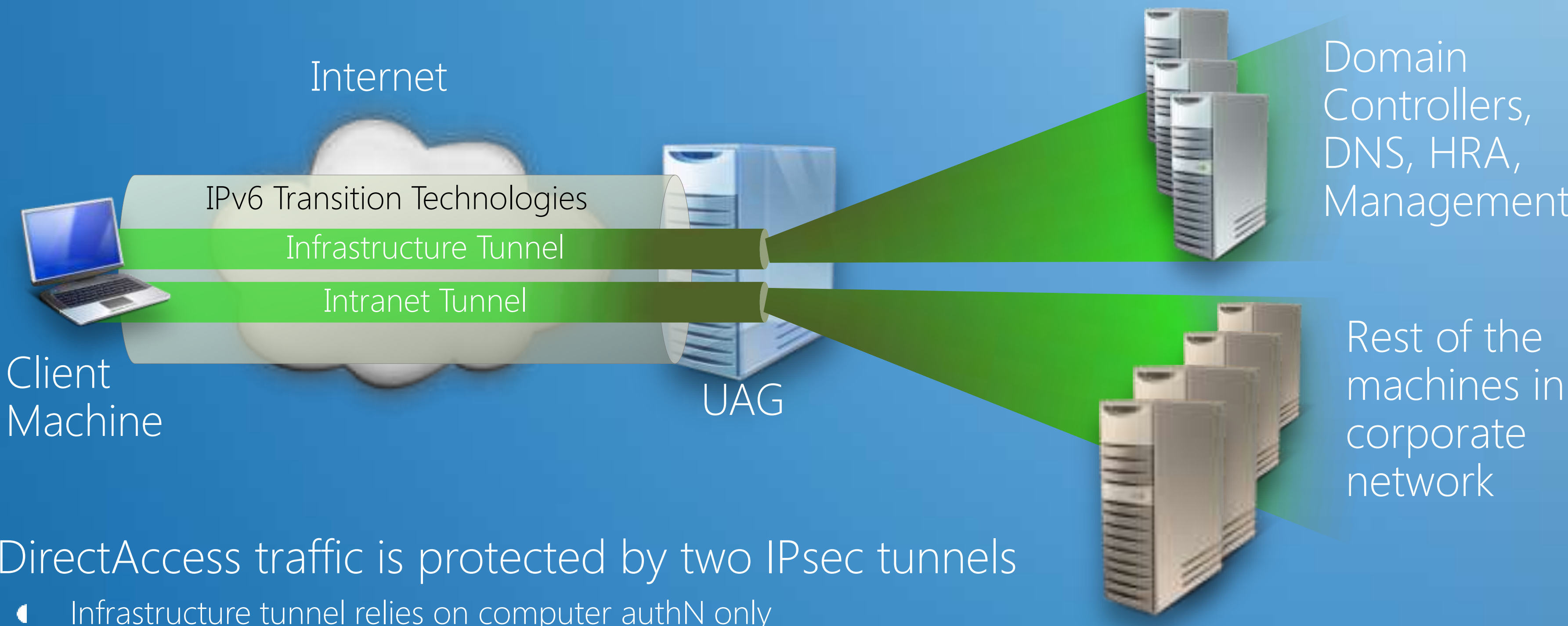
6to4, Teredo, IP-HTTPS

IPv6 encrypted IPsec ESP tunnel

IPv6 encrypted IPsec ESP tunnel

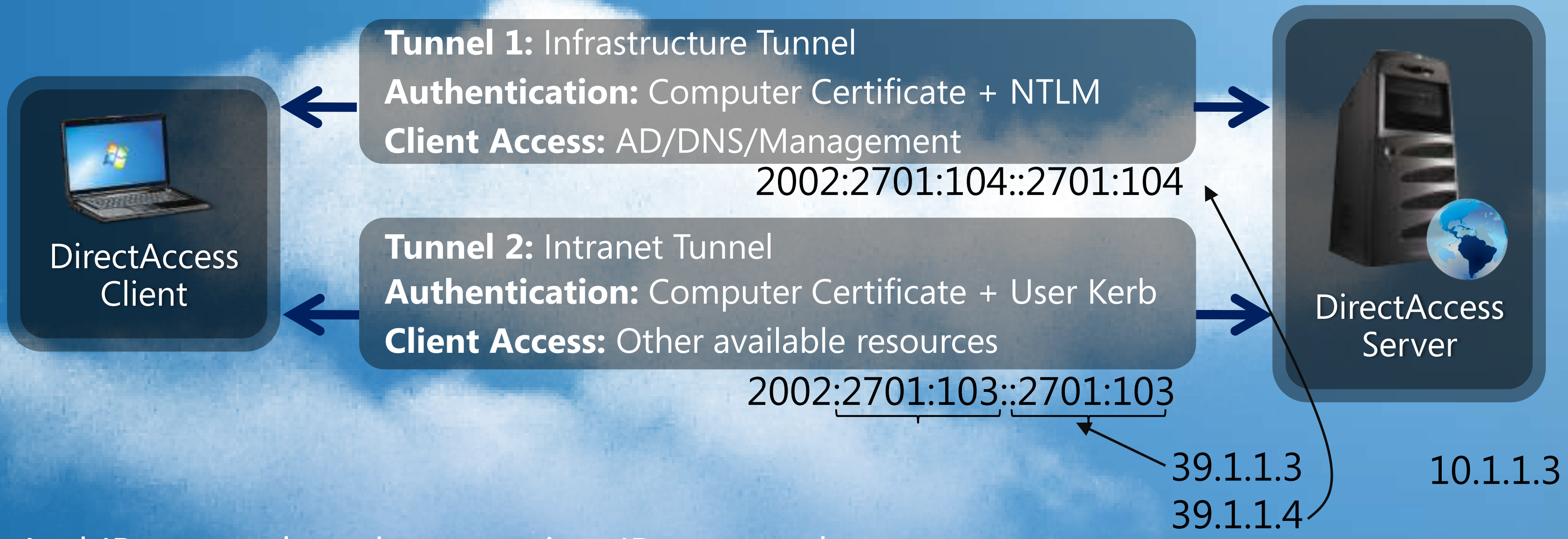
Native IPv6 IPsec Hardware Offload Supported

External IPv6 IPsec Detail


Internet
IPv6 Transition Technologies
Infrastructure Tunnel
Intranet Tunnel
Client Machine
UAG
Domain Controllers, DNS, HRA, Management
Rest of the machines in corporate network

- DirectAccess traffic is protected by two IPsec tunnels
  - Infrastructure tunnel relies on computer authN only
  - Intranet tunnel relies on computer + user authentication
- Identify which resources will be available in first tunnel
  - DCs/DNS, SCCM, AV servers – anything machines need to connect w/o user being logged on
  - Computer authN only elevates the risk – be selective!

IPv6 IPsec Tunnel Detail



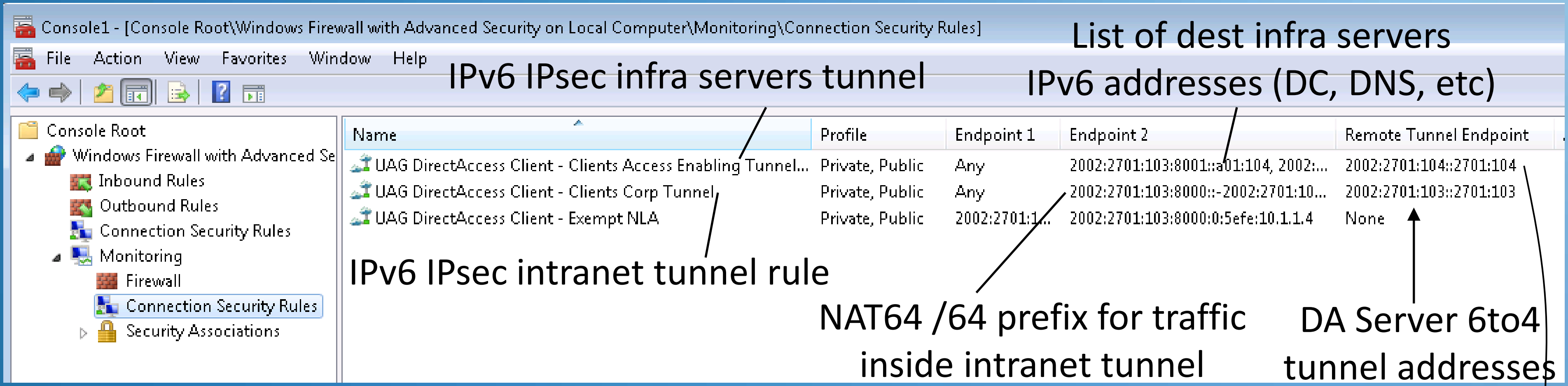
Tunnel 1: Infrastructure Tunnel
Authentication: Computer Certificate + NTLM
Client Access: AD/DNS/Management

Tunnel 2: Intranet Tunnel
Authentication: Computer Certificate + User Kerb
Client Access: Other available resources

- AuthIP protocol used to negotiate IPsec tunnels
- AuthIP tracks host security context that sends packet: computer or user
- Two independent authentications for each tunnel
- 1st Auth - Main Mode – Always computer authentication
- 2nd Auth – Extended Mode – computer or user auth, depending on packet
- Supports computer/user password auth, certificates, Kerberos, smartcards – no PSK

- IPv6 IPsec tunnel destination addresses are 6to4 addresses derived from public IPv4 IPs using within the lab (these addresses are only used within the virtual lab, not Internet)

DirectAccess Client IPsec Policy


Console1 - [Console Root\Windows Firewall with Advanced Security on Local Computer\Monitoring\Connection Security Rules]
File
Action
View
Favorites
Window
Help
Console Root
Windows Firewall with Advanced Se
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
Firewall
Connection Security Rules
Security Associations

Name	Profile	Endpoint 1	Endpoint 2	Remote Tunnel Endpoint
UAG DirectAccess Client - Clients Access Enabling Tunnel...	Private, Public	Any	2002:2701:103:8001::a01:104, 2002:...	2002:2701:104::2701:104
UAG DirectAccess Client - Clients Corp Tunnel	Private, Public	Any	2002:2701:103:8000::-2002:2701:10...	2002:2701:103::2701:103
UAG DirectAccess Client - Exempt NLA	Private, Public	2002:2701:1...	2002:2701:103:8000:0:5efe:10.1.1.4	None

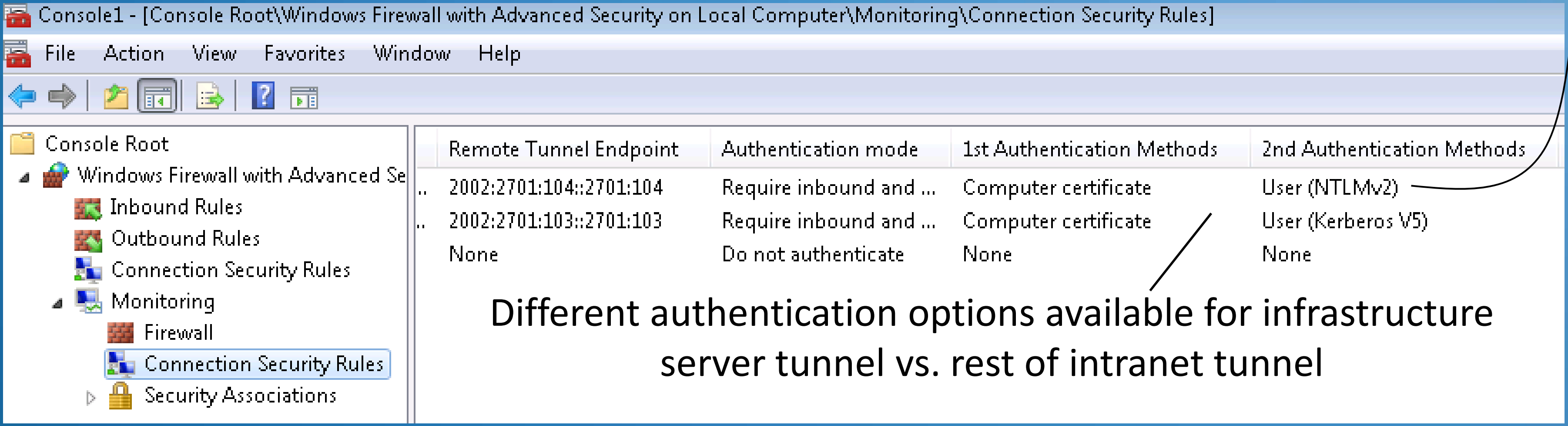
IPv6 IPsec infra servers tunnel

List of dest infra servers IPv6 addresses (DC, DNS, etc)

IPv6 IPsec intranet tunnel rule

NAT64 /64 prefix for traffic inside intranet tunnel

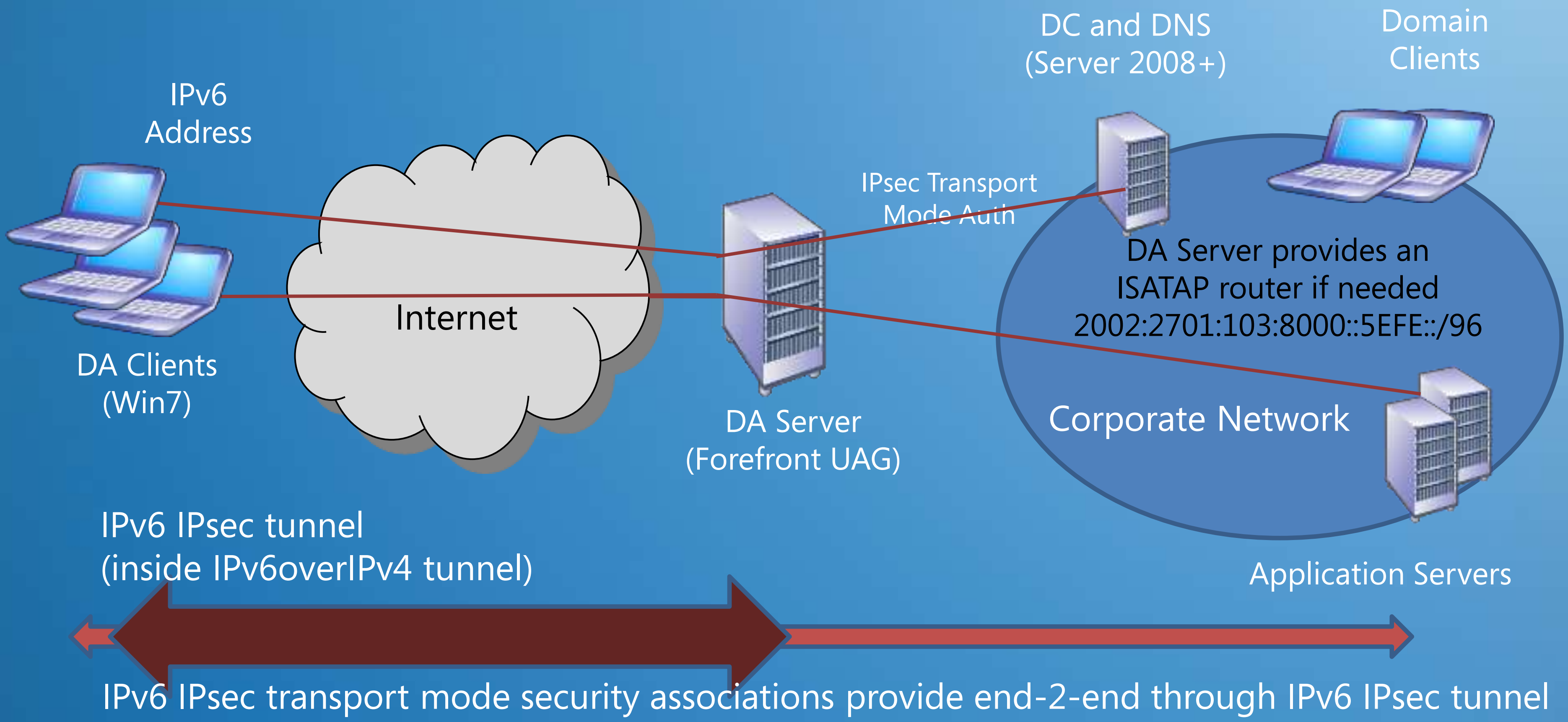
DA Server 6to4 tunnel addresses


Console1 - [Console Root\Windows Firewall with Advanced Security on Local Computer\Monitoring\Connection Security Rules]
File
Action
View
Favorites
Window
Help
Console Root
Windows Firewall with Advanced Se
Inbound Rules
Outbound Rules
Connection Security Rules
Monitoring
Firewall
Connection Security Rules
Security Associations

Remote Tunnel Endpoint	Authentication mode	1st Authentication Methods	2nd Authentication Methods
2002:2701:104::2701:104	Require inbound and ...	Computer certificate	User (NTLMv2)
2002:2701:103::2701:103	Require inbound and ...	Computer certificate	User (Kerberos V5)
None	Do not authenticate	None	None

Different authentication options available for infrastructure server tunnel vs. rest of intranet tunnel

Additional End-to-End IPsec Authentication



- If IPv6 available on internal network, IPsec transport mode possible
- IPsec transport can encrypt or just authenticate
- Provides fine-grained policy-based control on internal ho

Name Resolution Policy Table (NRPT)

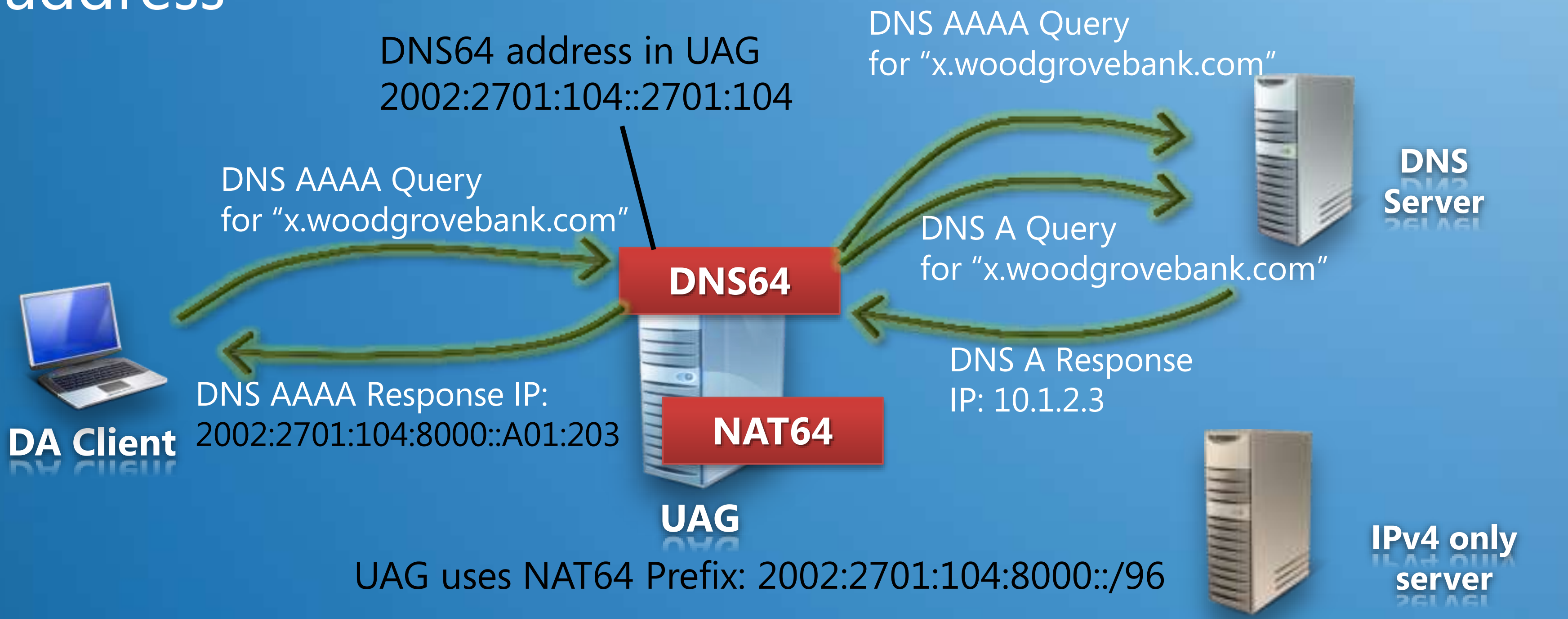
- Group Policy NRPT settings require DirectAccess clients to use internal DNS servers for internal namespaces
  - Clients can be required to use specific DNS servers for different DNS namespaces
  - Optionally, DNS queries for specific namespaces can be secured using IPSec
  - Single-label names (e.g. http://sharepoint) first get DNS suffix append

Namespace	DNS Servers
*.woodgrovebank.com	2002:2701:104::2701:104 (UAG DNS64) 2001:DB8:1234::1234 (internal IPv6 DNS if avail)
nls.woodgrovebank.com	None, exemption (network location server)
*.extranet.woodgrovebank.com	None, exemption if extranet namespace is within internal namespace so that clients can use public DNS servers IPs instead of redirecting

Netsh name show policy – the configured NRPT settings, may or may not be active
Netsh name show effective – the currently active NRPT settings

DNS64

DA Client resolve name of an IPv4 only server to IPv6 address



DNS64 address in UAG
2002:2701:104::2701:104

DNS AAAA Query
for "x.woodgrovebank.com"

DNS AAAA Query
for "x.woodgrovebank.com"

DNS A Query
for "x.woodgrovebank.com"

DNS A Response
IP: 10.1.2.3

DNS AAAA Response IP:
2002:2701:104:8000::A01:203

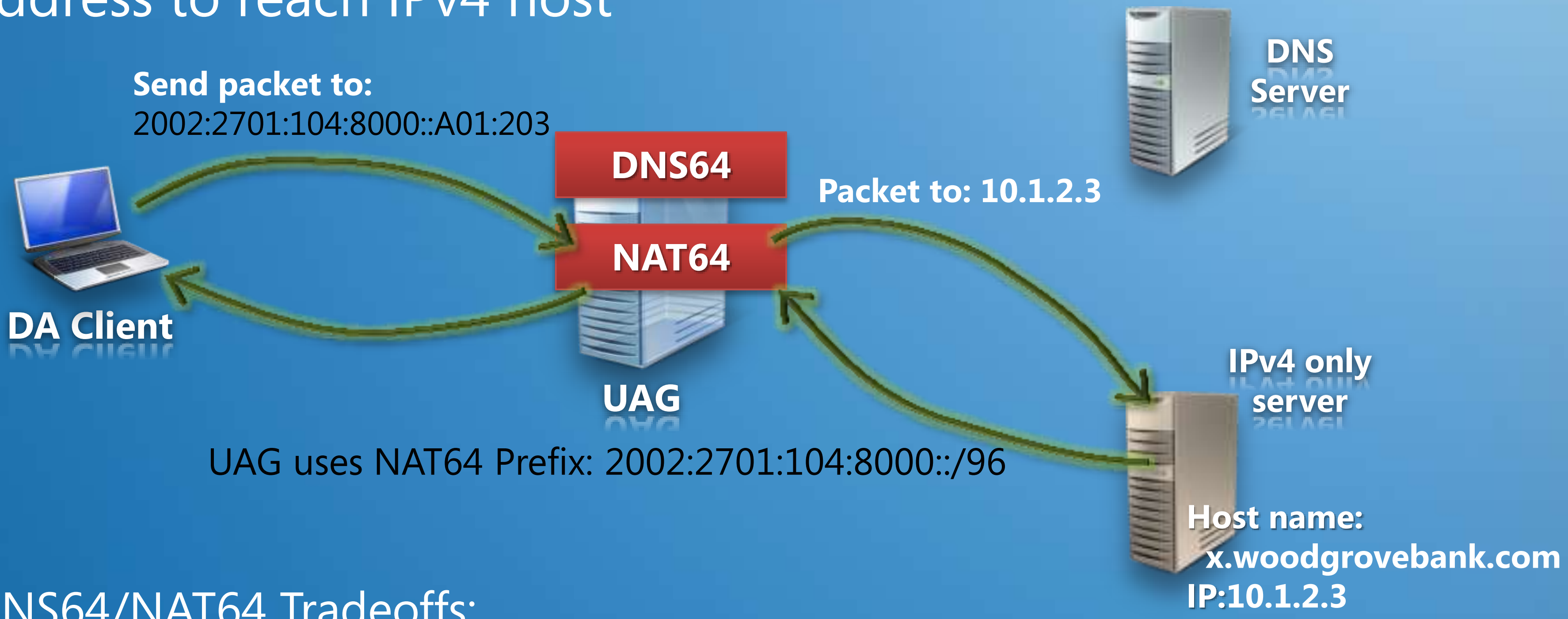
UAG uses NAT64 Prefix: 2002:2701:104:8000::/96

Host name:
x.woodgrovebank.com
IP:10.1.2.3

Namespace	DNS Servers
*.woodgrovebank.com	2002:2701:104::2701:104 (UAG DNS64)
nls.woodgrovebank.com	None, exemption (network location server)
*.extranet.woodgrovebank.com	None, exemption if extranet namespace is within internal namespace so that clients can use public DNS servers IPs instead of redirecting

NAT64

DA Client sends an IPv6 packet to the IPv6 NAT64 destination address to reach IPv4 host



Send packet to:
2002:2701:104:8000::A01:203

DNS64

NAT64

Packet to: 10.1.2.3

DNS Server

DA Client

UAG

IPv4 only server

UAG uses NAT64 Prefix: 2002:2701:104:8000::/96

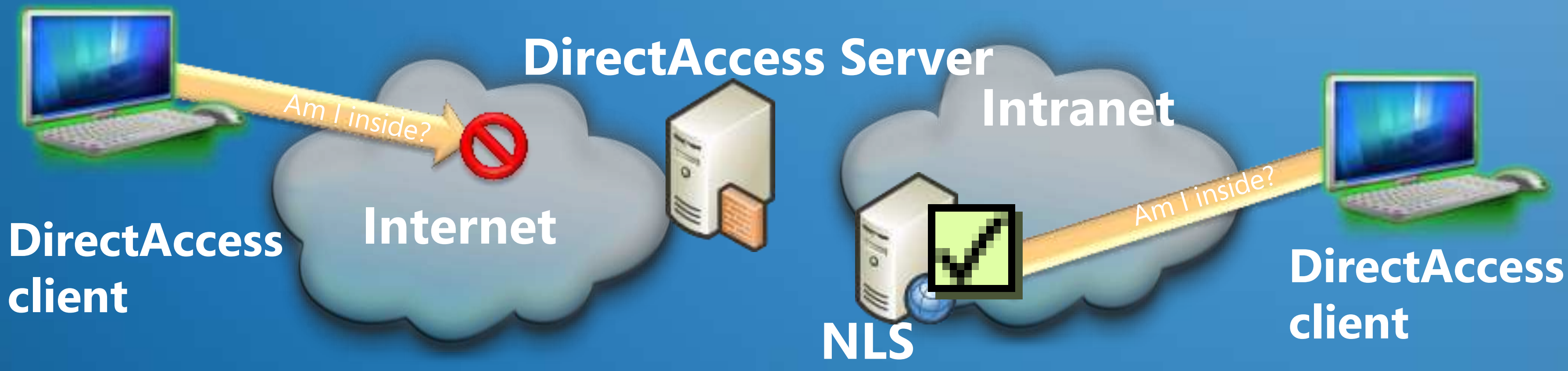
Host name:
x.woodgrovebank.com
IP:10.1.2.3

DNS64/NAT64 Tradeoffs:

- Obviates the need for IPv6 on intranet or internal hosts
- Does not enable outbound connect to DA client
- Does not allow IPv6 IPsec end-to-end
- Makes IPsec tunnel rules more difficult with NAT64 addresses

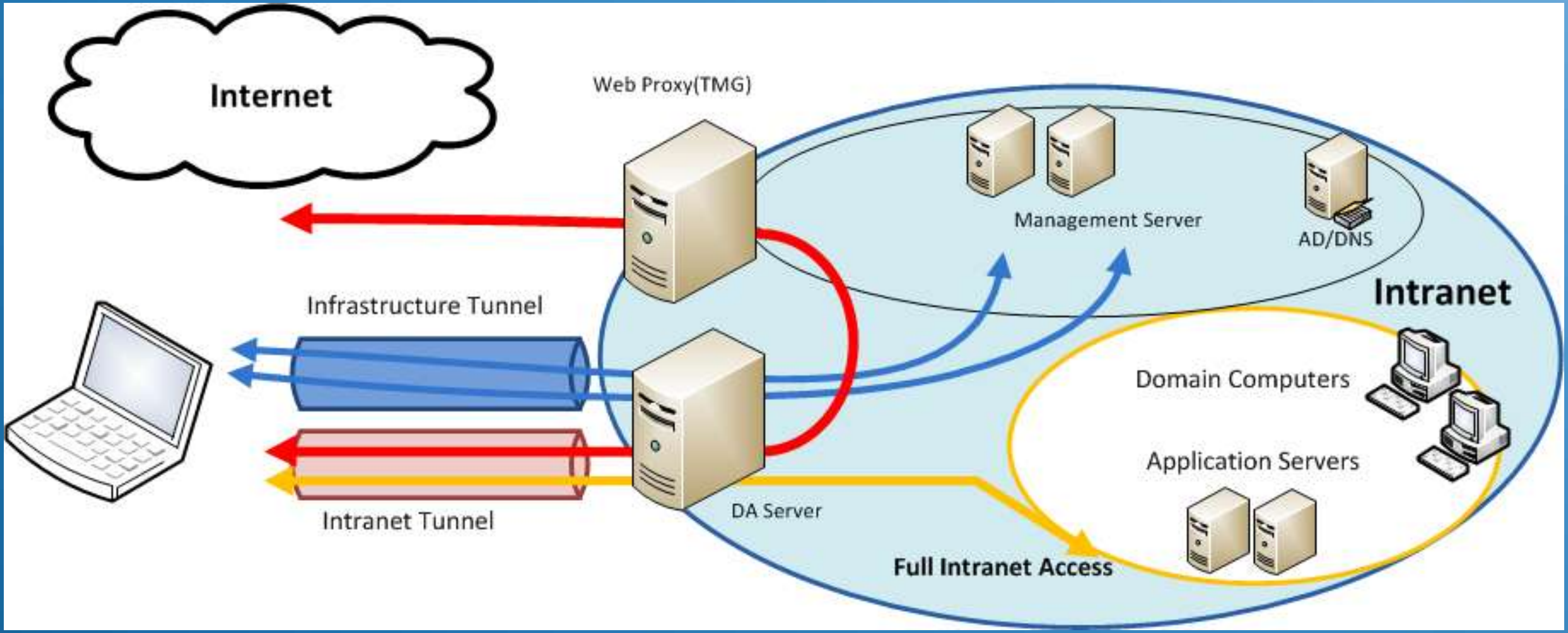
Network Location Determination

- Group Policy configures:
  - A "domain location determination server" FQDN, also called a network location server (NLS)
  - Name Resolution Policy Table (NRPT), which must exempt this NLS server name
- Client connects to network, assumes it is "outside":
  - "Public" profile of Windows Firewall used, with DirectAccess IPsec rules
  - NRPT active, does not redirect DNS resolution for NLS
- Attempt https to NLS, if reachable, then "inside":
  - "Domain" profile of Windows Firewall used, no DirectAccess IPsec rules
  - NRPT not active



Supports Split Tunneling or Forced Tunneling

- DirectAccess implements split-tunneling by default
- Can enable Force Tunneling option
  - Uses IP-HTTPS only
  - Once established, no IPv4 connectivity except local subnet, must either route or use internal proxy to Internet



Multi Factor Credentials for Intranet Access

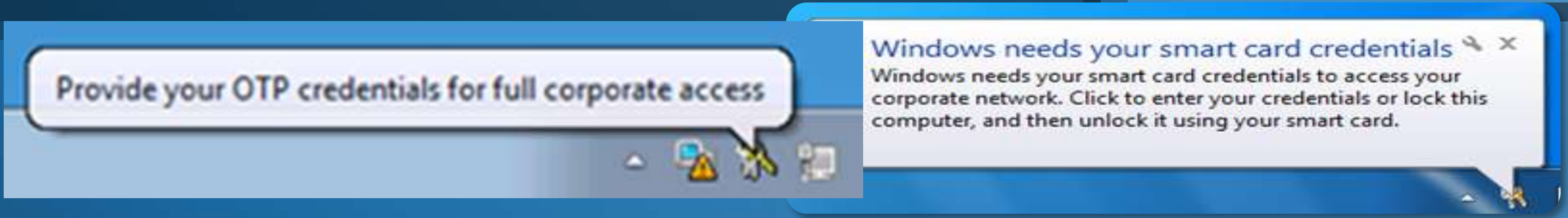
Two Factor Authentication (TFA) is fully supported, but not required

Edge-based enforcement is a smarter way to enforce TFA

Users are assigned a well-known SID when they log on with a smartcard (S-1-5-65)

Users may log on to a laptop without TFA

When users access corporate resources, the IPsec tunnel authorization policy checks for the SID



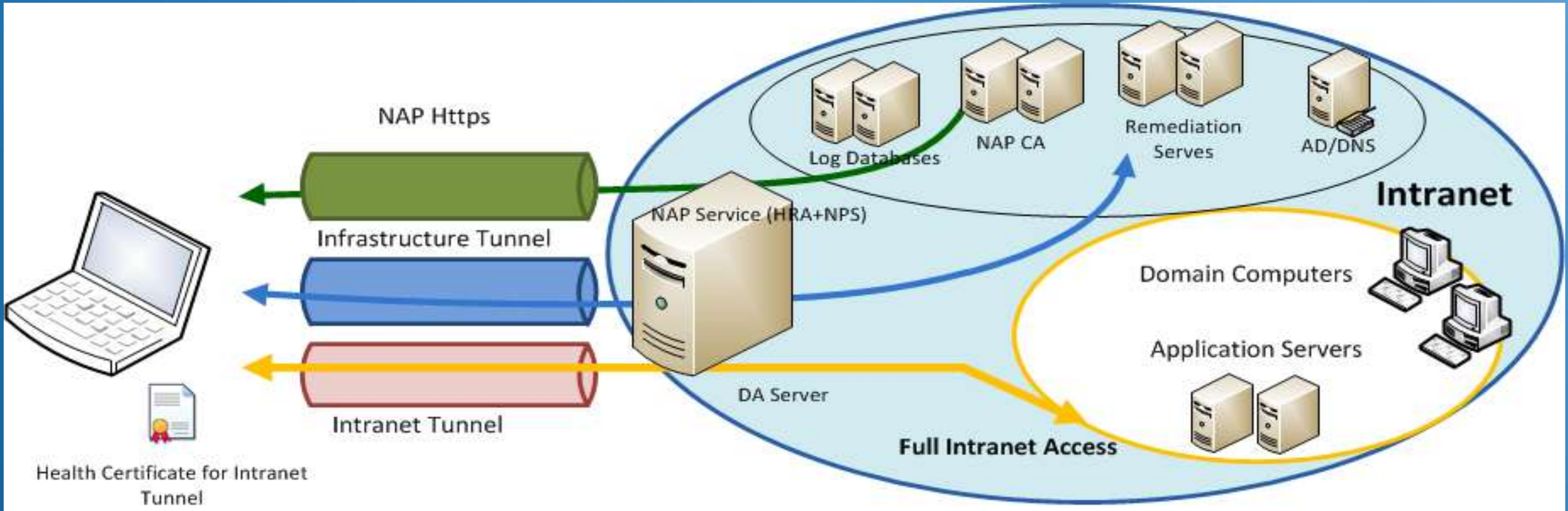
Provide your OTP credentials for full corporate access

Windows needs your smart card credentials

Windows needs your smart card credentials to access your corporate network. Click to enter your credentials or lock this computer, and then unlock it using your smart card.

NAP Health for Clients (Optional)

- NAP Health Certificate says client is “healthy” or “compliant” to policy
- NAP Health Registration Authority (HRA) – receives client cert request
- NAP Network Policy Server (NPS) -validates health claims, decides whether compliant or not to policy settings
- Supports reporting-only mode, deferred enforcement, full enforcement
- Enforce health on Intranet Tunnel unless HRA and remediation on Internet



Section 5:

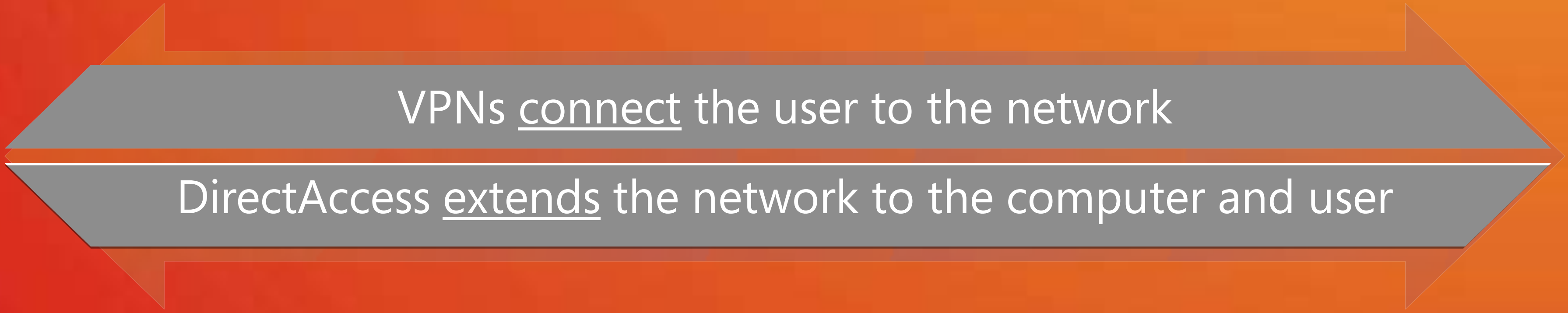
Summary

Deployment Resources

- Windows IPv6 Book, IPv6 Hands On Labs
  - Understanding IPv6 2nd Edition, Microsoft Press
  - http://microsoft.com/ipv6
- Forefront Online Virtual Labs (have IPv6 enabled)
  - http://technet.microsoft.com/hi-in/virtuallabs/bb499665
  - http://www.mssalesdemos.com – Business Ready Security
- Forefront UAG 2010 SP1 Eval Download:
  - http://technet.microsoft.com/en-us/evalcenter/dd183100.aspx
- Forefront UAG SP1 Lab Guides
  - http://technet.microsoft.com/hi-in/virtuallabs/bb499665
- Detailed Windows and UAG Design Guides
  - http://www.microsoft.com/directaccess
  - http://www.microsoft.com/uag
- Microsoft Consulting Service DirectAccess solution
- Microsoft Partners
- UAG Appliance Vendors

DirectAccess:
More than Remote Access

Always On	Manage Out	Access Policies	Protected Transactions
Improved productivity	"Light up" remote clients	Pre-logon health checks and remediation	Supports authenticated transactions
Not user initiated	Decreases patch miss rates	Replaces modal "connect-time" health checks	Supports encrypted transactions
Simplified connectivity	Applies GPOs to remote computers	Full NAP integration	Authentication and encryption mitigate many attacks



VPNs connect the user to the network

DirectAccess extends the network to the computer and user

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Requirements for DirectAccess

Customer Knowledge

- Should have a basic working knowledge of IPsec or TCP/IP
- Should be interested in learning and deploying new technologies, such as IPv6

DirectAccess Clients

- Windows 7 Enterprise Edition or Windows 7 Ultimate Edition
- Server 2008 R2 Standard Edition or Higher
- Domain-joined computers

DirectAccess Server

- Windows Server 2008 R2, Standard Edition or Higher
- Domain-joined computers

Others

- DNS Servers Supporting DirectAccess Clients - Windows Server 2008 SP2 or later for IPv6 internally
- A public key infrastructure (PKI) to issue computer certificates, smart card certificates, and, for NAP, health certificates.

Addendum: DirectAccess vs. VPNs

Benefits of DirectAccess Over Traditional VPNs:

- Connects the client computer automatically, without initiation by the user
- Works through all firewalls
- Supports selected server access and IPsec authentication with an Internet network server
- Supports end-to-end authentication and encryption
- Supports management of remote client computers

VPNs Still Provide Remote Access for:

- Windows Vista® and earlier versions of Windows client computers
- Client computers running non-Microsoft operating systems
- Non-domain joined computers