IPv6 Enabling Unix/Linux and Windows Integration

Global IPv6 Summit in Taiwan 2008

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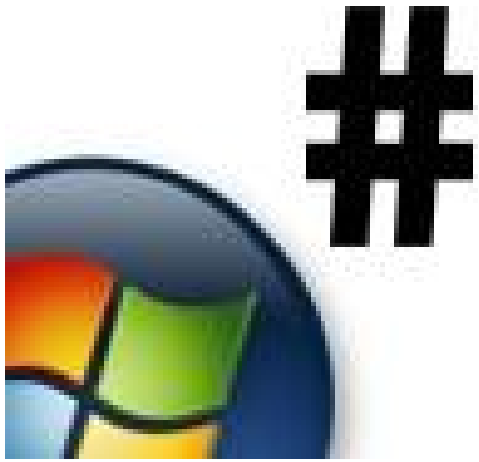
Background

- David Holder
  - Over ten years in IPv6
  - Twenty years Windows networking
  - Author
  - Erion Director
  - IPv6 enabling Samba

- Erion Ltd
  - Over ten years providing IPv6 training and consultancy
  - World's most comprehensive set of IPv6 training courses
  - E.g. MYNIC Malaysia's .my domain

Why is Integration so Important?

- 70% of networks are heterogeneous
- Single Sign On (SSO)
- Cross platform resource sharing
- Embedded systems (NAS)



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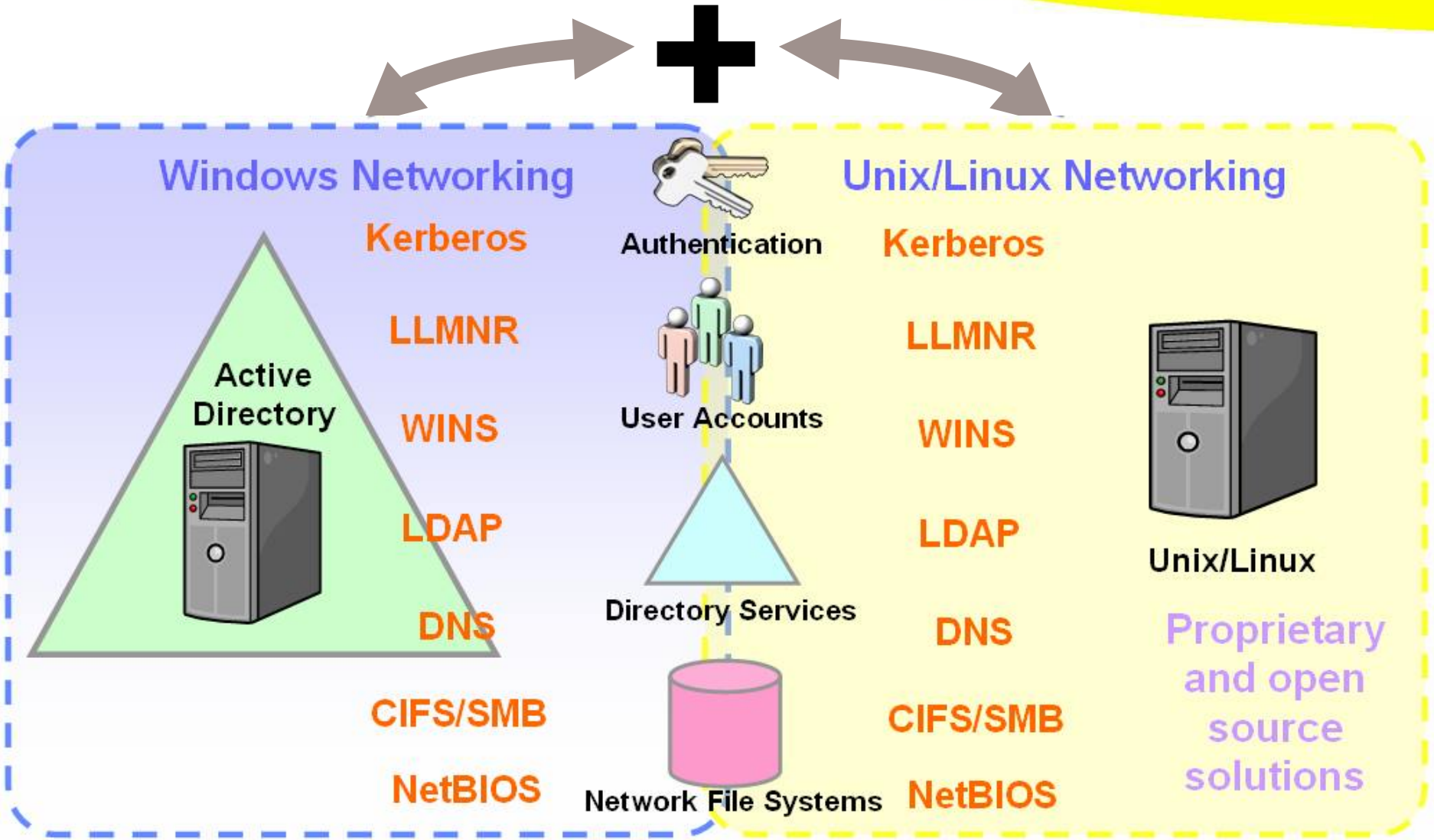
Windows & Unix/Linux Integration



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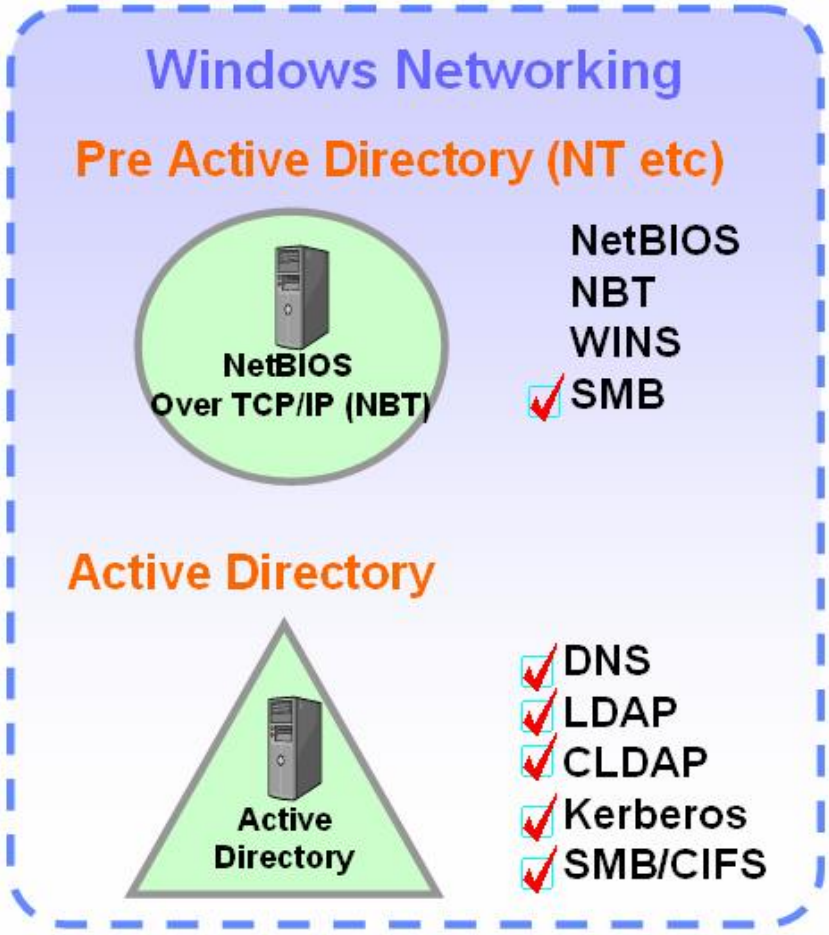
IPv6 and Windows Networking



- NetBIOS cannot be IPv6 enabled
- Raw SMB over IPv6 works ✓

Port	Protocol	Description
137	UDP	NBT Name Service
137	TCP	NBT Name Service
138	UDP	Datagram service
138	TCP	Unused
139	UDP	Unused
139	TCP	Session Service
445	**TCP**	**Raw SMB over TCP/IP** ✓

IPv4 Specific

- Active Directory: DNS, LDAP, CLDAP, Kerberos, SMB/CIFS can operate over IPv6 ✓

NOTE: Active Directory is more than *the sum of the individual protocols*

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Windows and IPv6 Name Resolution

- NetBIOS name resolution — IPv4 Only
- WINS — IPv4 Only
- Hosts file — IPv4 and IPv6 ✓
- Link-local Multicast Name Resolution (LLMNR) — IPv4 and IPv6 ✓
- DNS — IPv4 and IPv6 ✓
- Literal Addresses — IPv4 and IPv6 ✓

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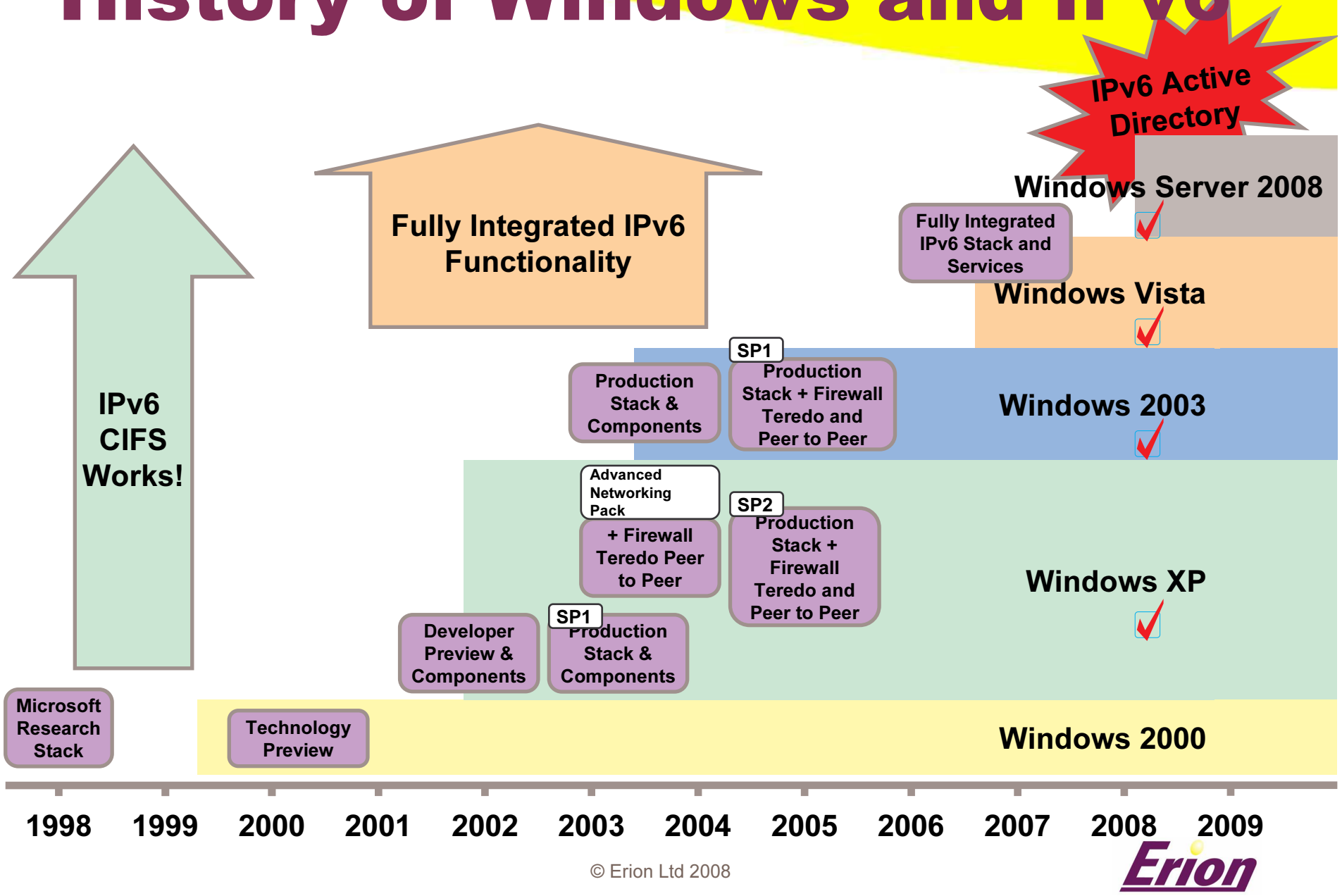
History of Windows and IPv6



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Windows Networking & IPv6

		IPv4	IPv6
	NBT/NetBIOS	Yes	No
	WINS	Yes	No
	NT Domains	Yes	No
SMB/CIFS File Sharing	Windows XP	Yes	Yes ✓
	Windows 2003	Yes	Yes ✓
Active Directory Including file sharing and *everything…*	Windows Vista	Yes	Yes ✓
	Windows Server 2008	Yes	Yes ✓

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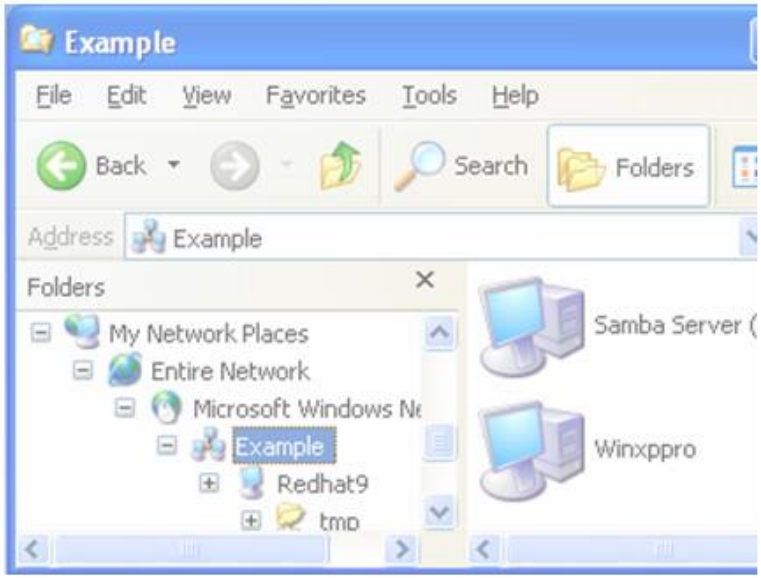
Case Study: Samba and IPv6

Case Study: Samba and IPv6

- Most widely used integration software
  - Standard on Linux/Unix
  - NAS boxes, PDAs, Mainframes, Macs…
  - Many commercial products based on Samba



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Samba 3.2 and IPv6

- IPv6 enabled by default
- IPv6 transport works!
  - Client and server side functionality over IPv6
  - Join Windows Server 2008 AD domains over IPv6
  - Serve shares and printers over IPv6

- Erion provided consultancy and testing for IPv6 on Samba 3.2
  - First ever join over IPv6 with Samba 3.2 by David Holder

    (see: http://www.ipv6consultancy.com/ipv6blog/?p=25)

IPv6 Samba 3.2 Join to Windows Server 2008 Domain

Wednesday, January 30th, 2008

Yesterday I carried out the first every join of a Samba 3.2 server to a Windows domain over IPv6.

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Samba 3.2 and IPv6 Example

```
# smbclient -L //3000::1 -U Administrator
Password:
Domain=[TREE] OS=[Windows Server (R) 2008 Enterprise 6001 Service
Pack 1] Server=[Windows Server (R) 2008 Enterprise 6.0]
        Sharename       Type      Comment
        ---------       ----      -------
        ADMIN$          Disk      Remote Admin
        C$              Disk      Default share
        IPC$            IPC       Remote IPC
        NETLOGON        Disk      Logon server share
        SYSVOL          Disk      Logon server share
        TestShare       Disk
```

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Samba 4 and IPv6

- IPv6 *not* enabled by default
  - IPv6 provisioning works with IPv6 address option
  - IPv6 development branch
- IPv6 can be enabled with Erion patch
  - See http://www.ipv6consultancy.com/ipv6blog
  - Erion working with Samba Team to bring patch into mainstream
- With patch IPv6 transport works!
  - IPv6 client and server side functionality
  - IPv6 domain controller functionality
  - Join Samba4 domains over IPv6

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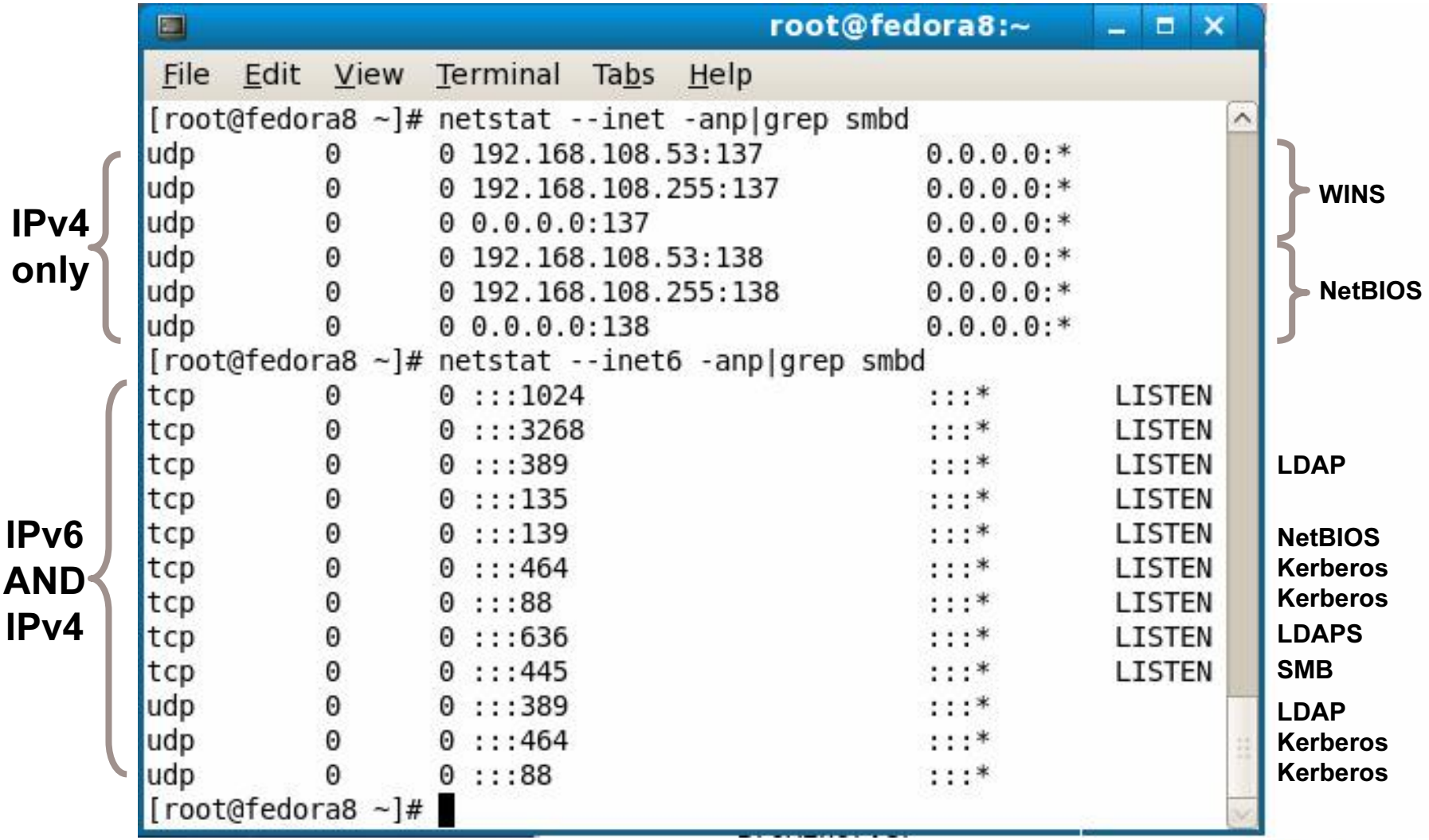
IPv6 Enabled Samba4



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Joins to Samba4 over IPv6

- First Windows Vista and Windows Server 2008 join Samba4 domains over IPv6
  - Carried out by Erion September 2007 (http://www.ipv6consultancy.com/ipv6blog/?p=23)

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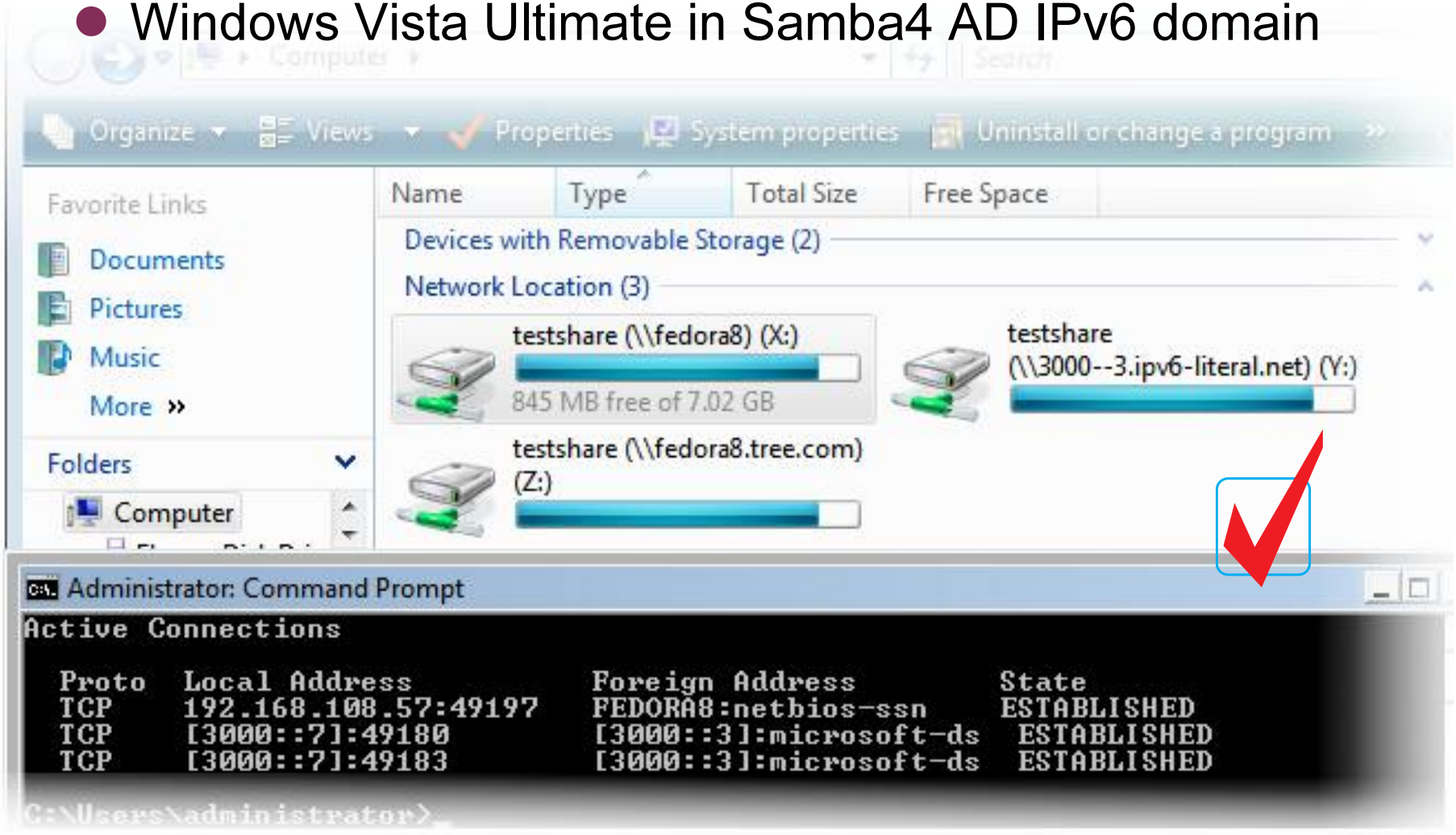
Samba4 IPv6 Shares

- Windows Vista Ultimate in Samba4 AD IPv6 domain



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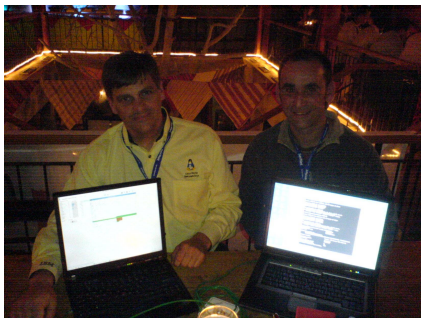
Linux CIFS and IPv6

- Kernel CIFS module is IPv6 enabled by default
  - Since SambaXP 2007



Steve French (IBM) and David Holder (Erion) The first ever CIFS client connection over IPv6

- **`mount.cifs`**
  - Supports IPv6 addresses in the **`ip`** option

```
# mount -t cifs //W2008KENT/TESTSHARE /mnt/erion \
     -o ip=2a01:384:e14:0:fc6f:e78f:6507:4ad,    \
     user=Administrator,pass='Pa$$w0rd'
```

  - **Note:** No IPv6 name resolution
  - Erion IPv6 patch enables IPv6 name resolution
    - See http://www.ipv6consultancy.com/ipv6blog/?p=32

```
Local Address              Foreign Address            State
[2a01:348:13e:0:fc6f:d88f:6507:4ad]:445  [2a01:348:13e:0:20c:29ff:fea0:3883]:35906  ESTABLISHED

\Administrator>_
```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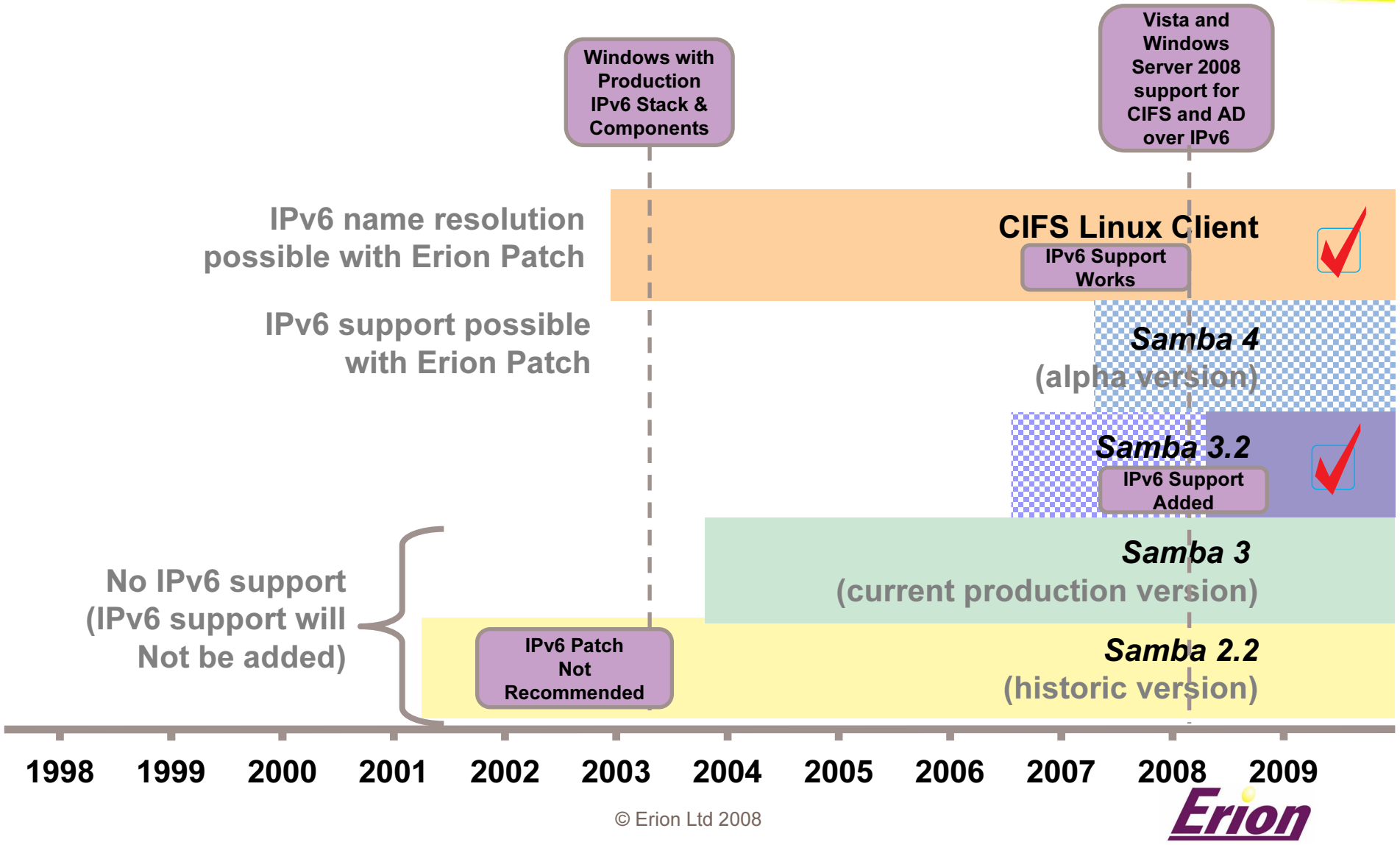
History of Samba and IPv6



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Samba and IPv6: What Works

- Mounting windows shares as Linux networked file systems
  - The Linux CIFS client
- IPv6 file sharing
  - Windows XP, Windows Vista, Windows Server 2003, Windows Server 2008, Linux CIFS client, Samba 3.2 & **patched** Samba 4
- Joining Windows Server 2008 Active Directory domain
  - Samba 3.2
  - Samba 4 (alpha, patched)
- Acting as a Domain Controller
  - **Patched** Samba 4 (alpha)

Note: Cannot use Samba 3.2 as domain controller as it can only act as an NT domain controller and this is not IPv6 enabled in Samba or Windows

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The Future: IPv6 & Integration

- Unix & Linux Distributions update to Samba 3.2
- Network Attached Storage (NAS) vendors provide IPv6 support using Samba 3.2
- Commercial integration products need upgrading to IPv6
- Vendors using Linux CIFS Client need IPv6 name resolution

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Conclusion

- IPv6 Windows and Unix/Linux interoperability is possible now
- IPv6 support for heterogeneous environments is critical with the release of Windows Server 2008 and Windows Vista
- Significant progress made with Samba and IPv6
- Commercial products lagging behind

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IPv6 and Samba References

- SambaXP 2008 Presentation
  - http://www.ipv6consultancy.com/ipv6blog/?p=34
- Google IPv6 Conference 2008 (YouTube)
  - http://youtube.com/watch?v=iK0nzdtzjvM
- Google CIFS Workshop Presentation
  - http://www.ipv6consultancy.com/ipv6blog/?p=21
- SambaXP 2007 Presentation
  - http://www.sambaxp.org/files/SambaXP2007-PDF/Holder-SambaVistawithIPv6V2.pdf
  - http://www.ipv6consultancy.com/ipv6blog/?p=8
- Linux CIFS Client
  - http://www.ipv6consultancy.com/ipv6blog/?p=9
- Samba4 Hack (*old version*)
  - http://www.ipv6consultancy.com/ipv6blog/?p=12

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Erion and IPv6 References

- IPv6 Services
  - http://www.erion.co.uk/ipv6.html
- IPv6 Blog
  - http://www.ipv6consultancy.com/ipv6blog
- IPv6 Training
  - http://www.ipv6training.com
- IPv6 Consultancy
  - http://www.ipv6consultancy.com

- Contact david.holder@erion.co.uk

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Questions

Thank you for listening