An IPv6 deployment scenario

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What customers for IPv6 now?

- **Those who already have enough IPv4 global addresses?**

  » Not likely in the short term due to the lack of value added IPv6 services

- **Those who are using private IPv4 addresses together with NATs or proxies?**

  » Not likely in the short term due to the lack of value added IPv6 services

- **New customers?**

  » **Yes**, for new customers deploying IPv6 now would be **a future proof opportunity**

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What IPv6 solution can I offer?

- ## A dual-stack network?

  - » It allows easy transition and assures full interoperability with the traditional IPv4 Internet
  - » But increases network complexity and the customer has to manage a double (IPv4/IPv6) routing infrastructure

- ## An IPv6 only network?

  - » A new customer could deploy an IPv6 only network and NAT-PT instead of a private IPv4 network with NAT
    - This is because deploying an IPv6 only network and NAT-PT is approximately as complex as deploying a private IPv4 network with NAT
  - » But we must be able to provide all the basic Intranet/Internet services (e.g. WWW, e-mail, etc.) over an IPv6 only network
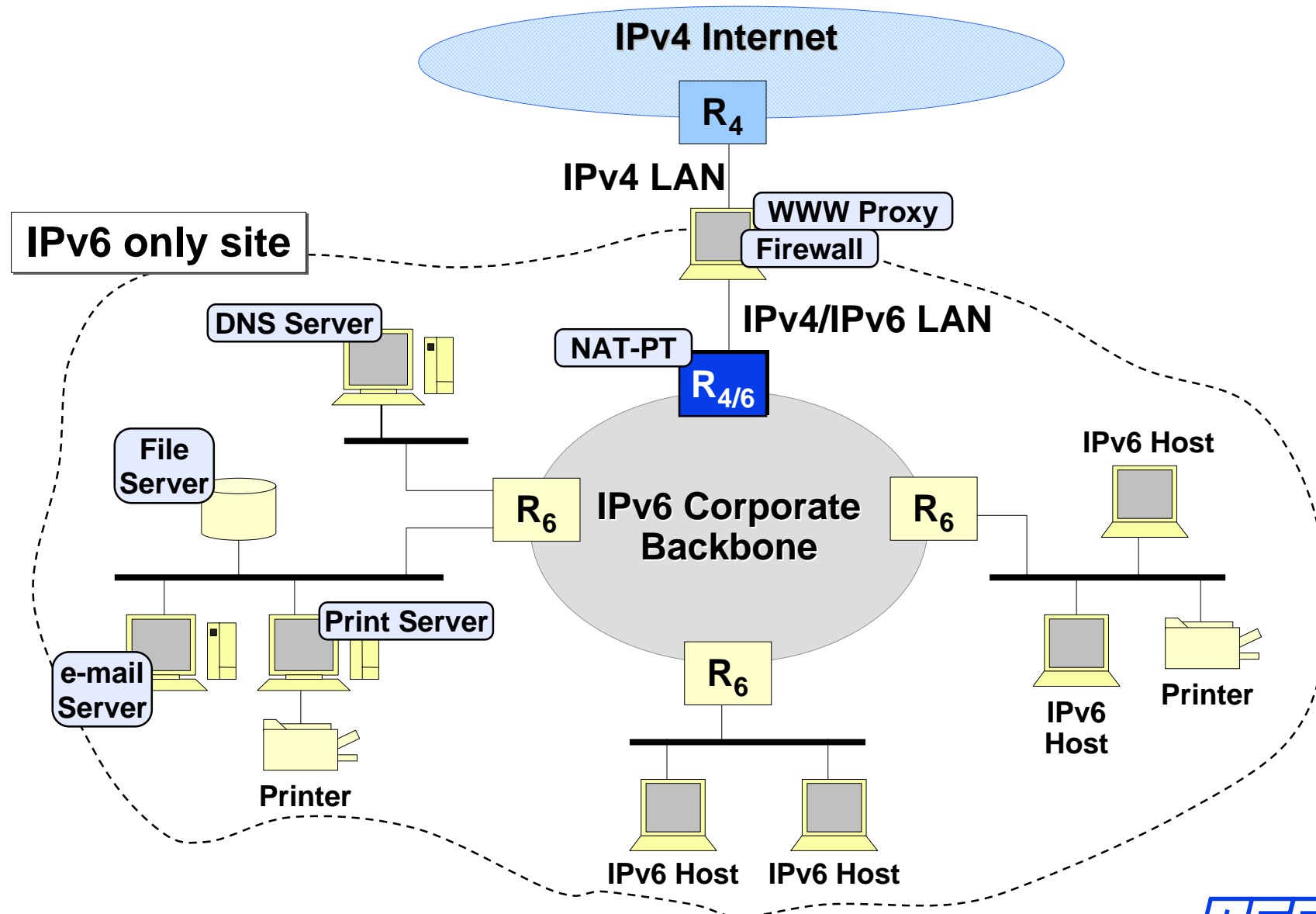
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Basic network services

Internet

- **DNS**

- **Web browsing**

- **e-mail**

Intranet

- **e-mail**

- **Database and applications servers**
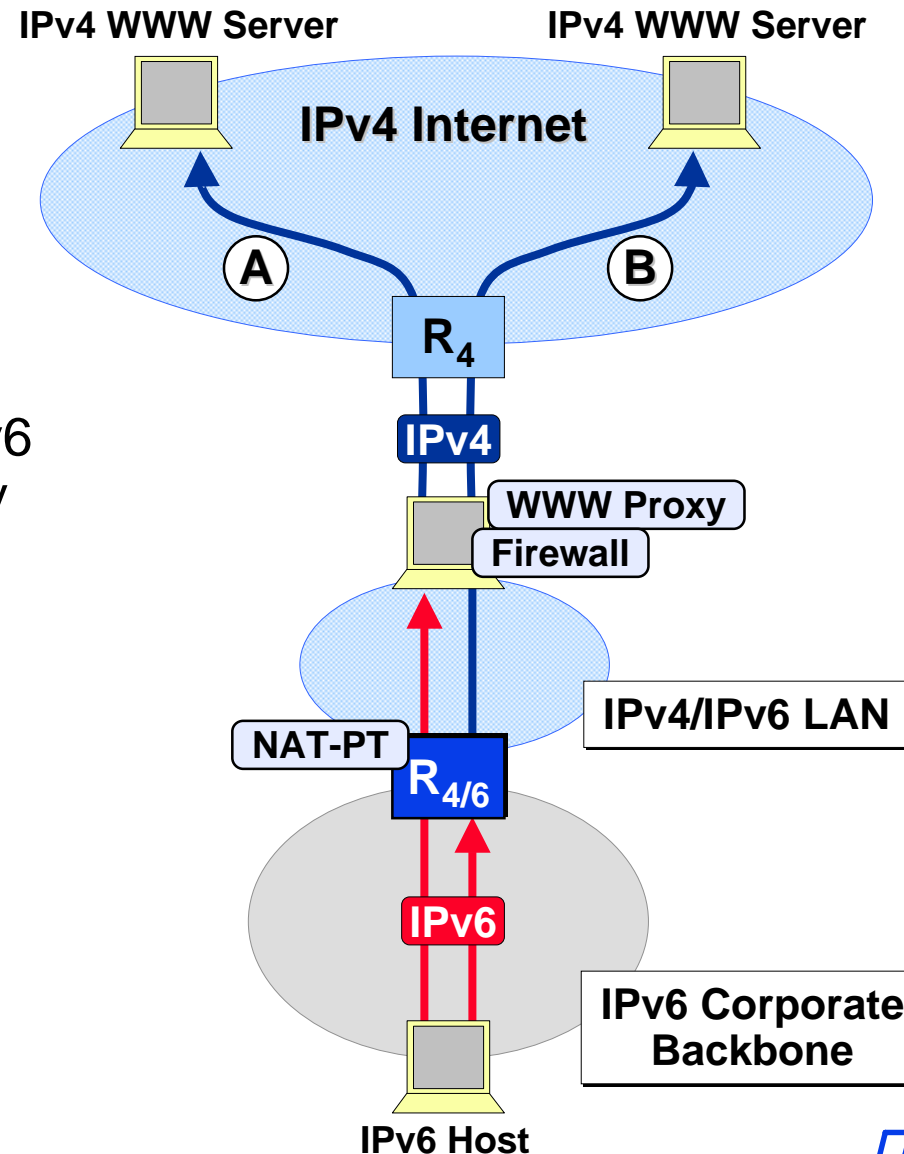
- **Printing services**

- **Network management**

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An example of IPv6 only site

IPv4 Internet

R_4

IPv4 LAN

IPv6 only site

WWW Proxy

Firewall

IPv4/IPv6 LAN

DNS Server

NAT-PT

$R_{4/6}$

File Server

IPv6 Host

R_6

IPv6 Corporate Backbone

R_6

e-mail Server

Print Server

R_6

Printer

IPv6 Host

Printer

IPv6 Host

IPv6 Host

IPv6 Host

44th IETF, Minneapolis, March 1999, IPv6 Deployment Initiative

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Browsing the IPv4 WWW

IPv4 WWW Server **IPv4 WWW Server**

IPv4 Internet

- **Solutions**

  (A) going through an IPv6 capable WWW proxy

  (B) using NAT-PT (no proxy)

A   B

R₄

IPv4

WWW Proxy

Firewall

IPv4/IPv6 LAN

NAT-PT

R₄/₆

IPv6

IPv6 Corporate Backbone

IPv6 Host

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A transition scenario

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Issues
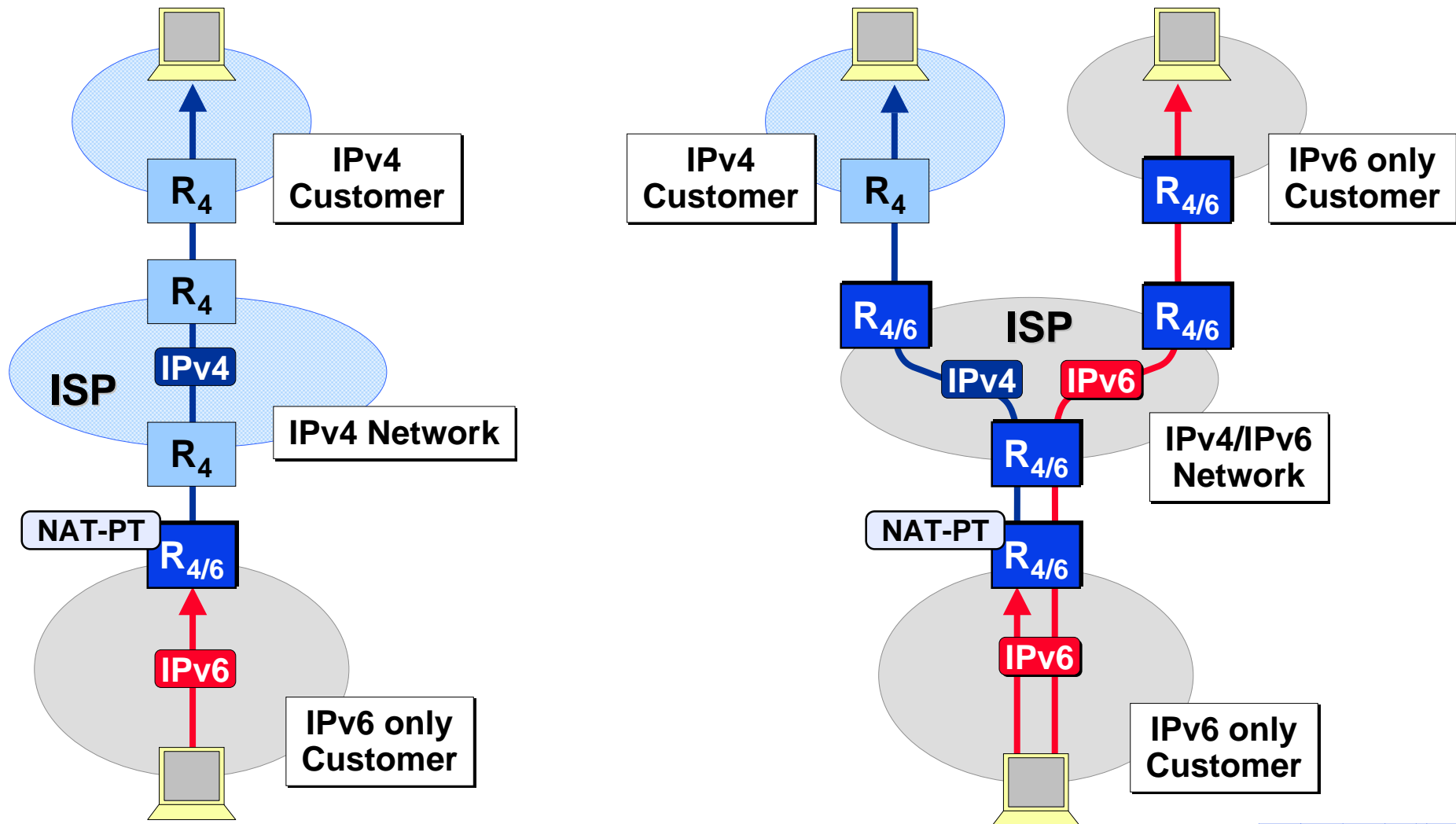
- **At present all DNS messages are conveyed into IPv4 packets**

  » This is a serious obstacle to the deployment of an IPv6 only network

- **Lack of support for some basic services and applications in many common IPv6 platforms**

  » e.g. Microsoft Windows

- **Lack of IPv6 MIBs and management tools**

Software availability (1)

Service	Protocol	Client software	Server software
DNS	DNS	**Resolver (IPv4 transport)** (All systems)	**Bind (IPv4 transport)** (All systems)
WWW	http	**Mosaic, mMosaic** (Solaris) **MMM** (IPv6 Inria, KAME, etc.) **Internet Explorer** (IPv6 Microsoft Research) **Netscape** (Mozilla ported to IPv6 in KAME)	**NCSA** (Solaris) **Apache** (IPv6 Inria, KAME, etc.) **fnord** (IPv6 Microsoft Research)
Network Management	**SNMP IPv6 MIBs**	**IPv6 MIBs** (Some available in KAME)	**IPv6 MIBs** (Some available in KAME)

Software availability (2)

Service	Protocol	Client software	Server software
Print Services	**LPR** **Other?**	**lpr** (IPv6 Inria)	**lpd** (IPv6 Inria)
e-mail	**SMTP** **POP** **IMAP** **Other?**	**POP Client** (KAME)	**qmail** (KAME) **sendmail** (IPv6 Inria, KAME, Solaris, etc.) **POP Server** (KAME)
File Servers	**NFS (based on RPC and XDR)**	**mount** (IPv6 Inria, planned in KAME)	**mountd, nfsd** (IPv6 Inria, planned in KAME)

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