

GLOBAL IPv6 SERVICE LAUNCH EVENT



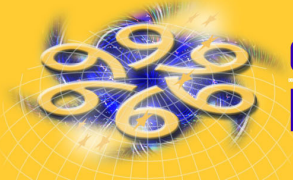
The impact of IPv6 on Research Networks

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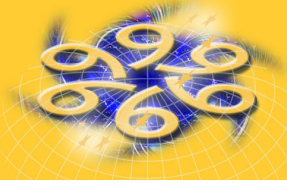
Brussels, 15-16 January 2004



Why IPv6 and Research Networks ?

- IPv6 is for the wider community, beyond the capabilities of IPv4
- Research networks lead by example
 - provide a path between research on IPv6 and deployment
 - enable research with IPv6
- *Research Networks have an impact on IPv6*





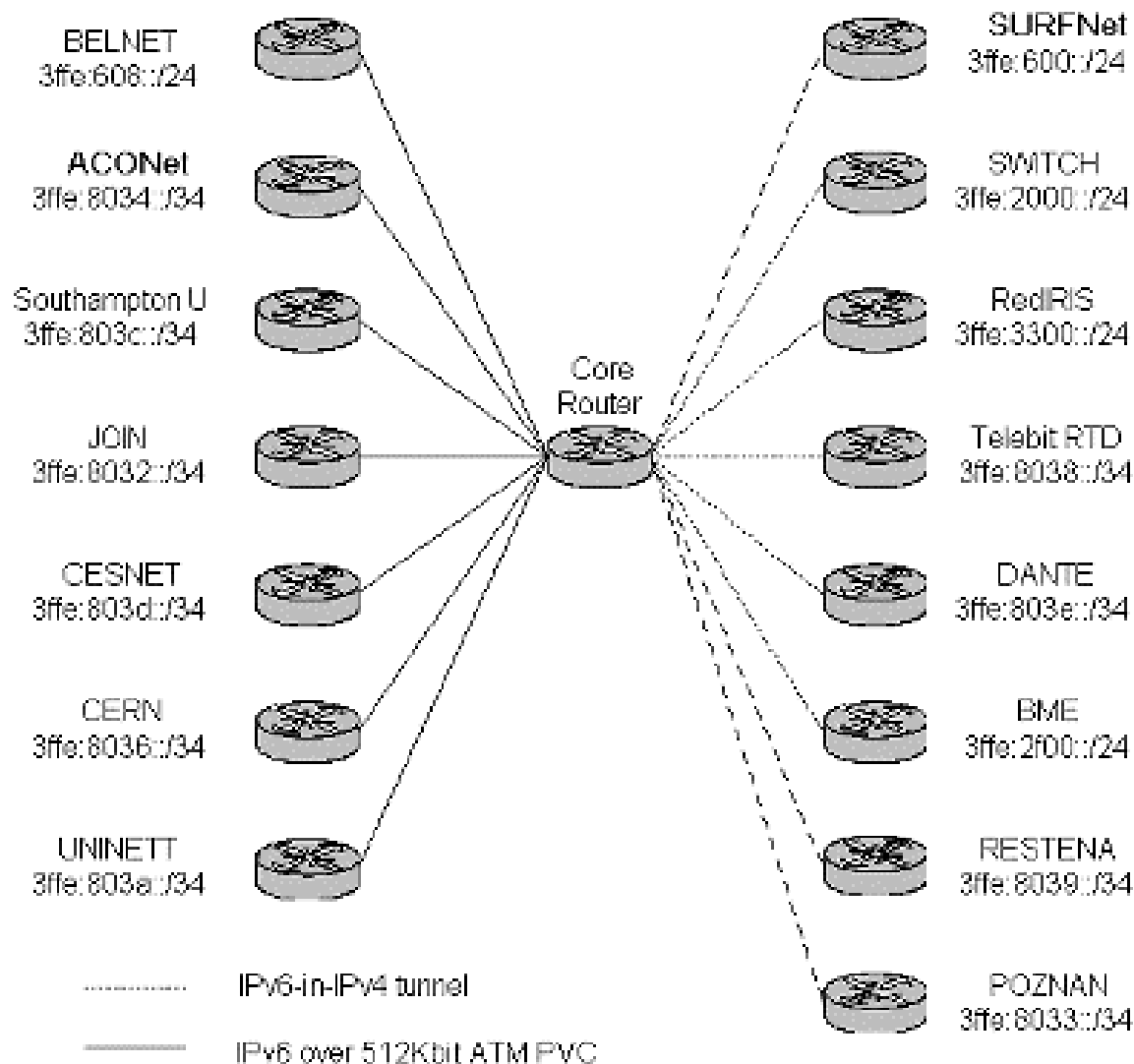
The beginning of IPv6 enabled networks

- 6Bone, since 1996
- Several National activities
- TF-NGN/ GÉANT activity since 1998 (QTPv6, GTPv6)
 - tunnelled links, often unrelated to underlying topology and interconnections
 - sub-optimal performance BUT
 - massively valuable experience
- *Performance and reliability require native IPv6, or reliable tunnels*



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GTPv6 Network, July 2001





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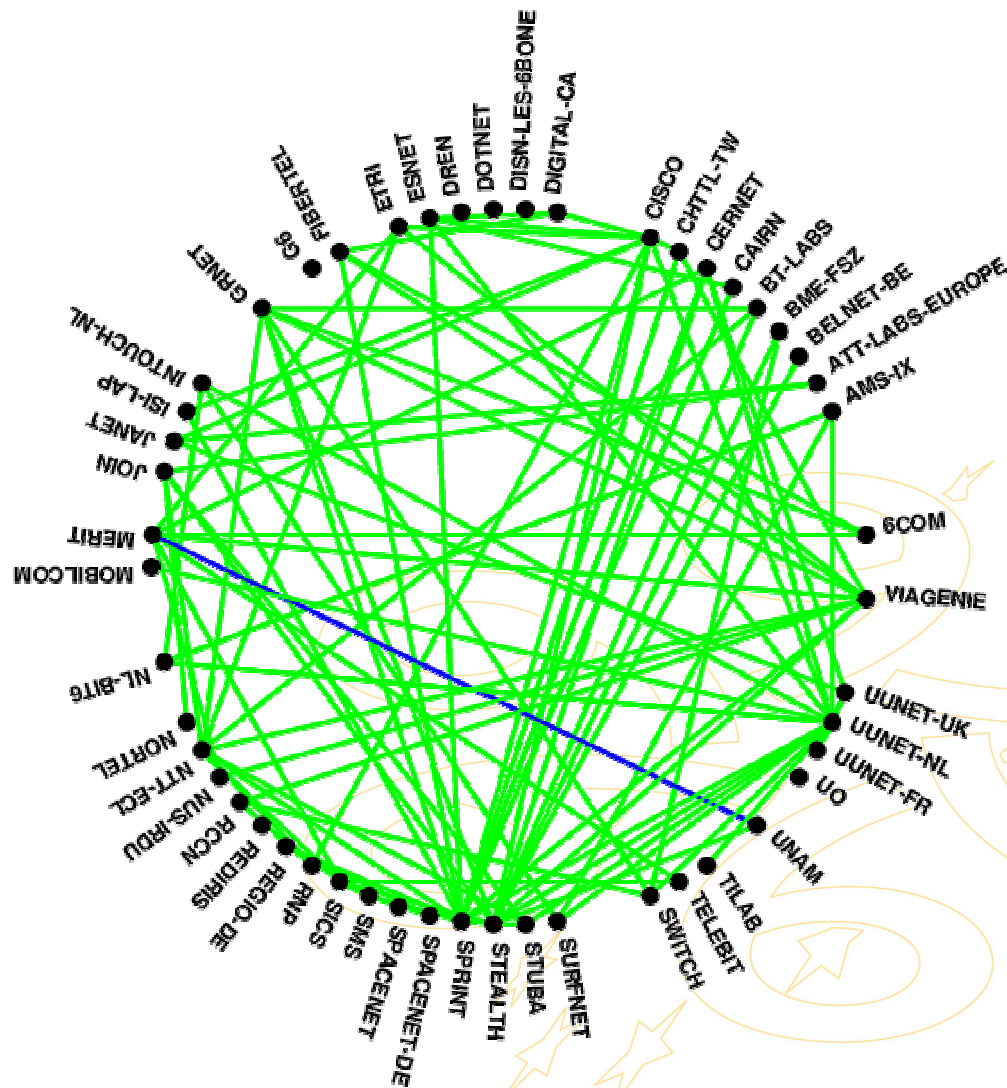
UK IPv6 Resource Centre Lancaster University Computing Department

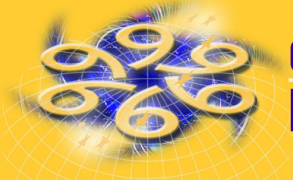
Backbone Site Connectivity for 6Bone



Mon Jan 5 04:06:03 2004

STATIC —
RIPng —
IDRPv6 —
BGP4+ —
UNKNOWN —



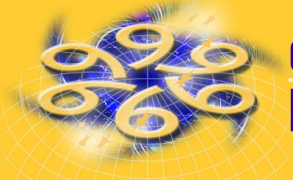


IPv6 on GÉANT



- Native , dual-stack
- Deployed (Spring 2003) and operational (Summer 2003)
- 24 NRENs connected, 2 pending (HR, ML)
- 18 native, 6 tunnelled

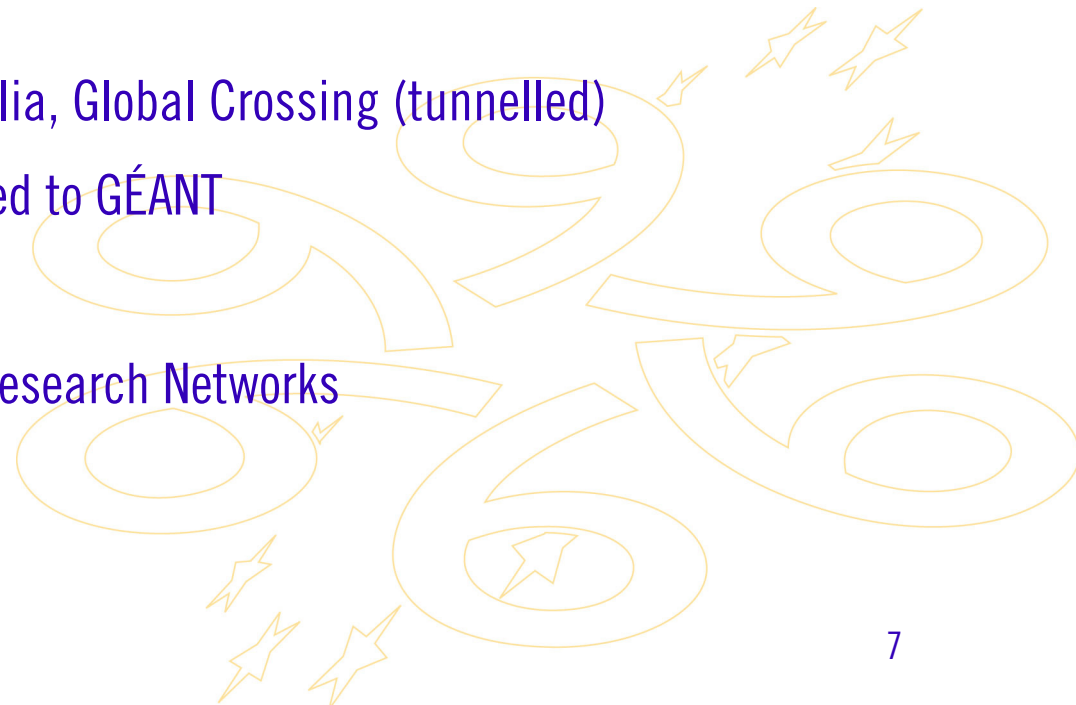


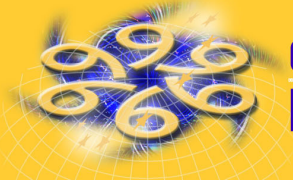


GÉANT IPv6 Global Reach



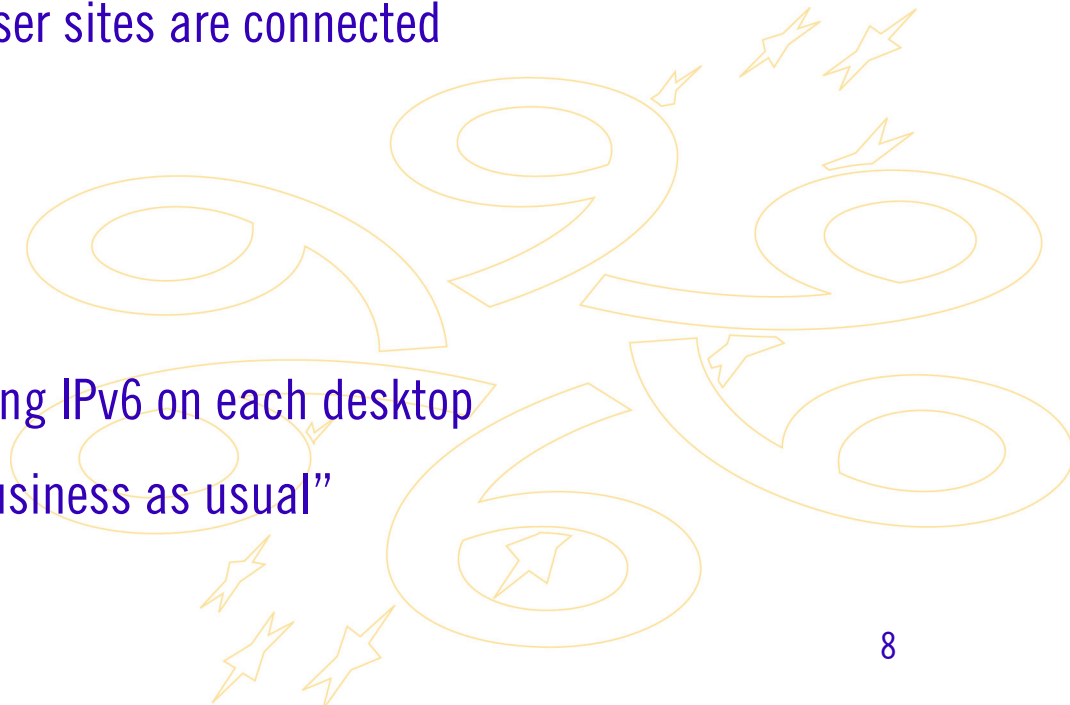
- Research interconnections with Abilene, CA-net4, ESnet, Sinet (all native)
- Korea via RENATER
- commodity interconnections with Telia, Global Crossing (tunnelled)
 - available to all NRENs connected to GÉANT
- GÉANT can reach all IPv6 enabled Research Networks





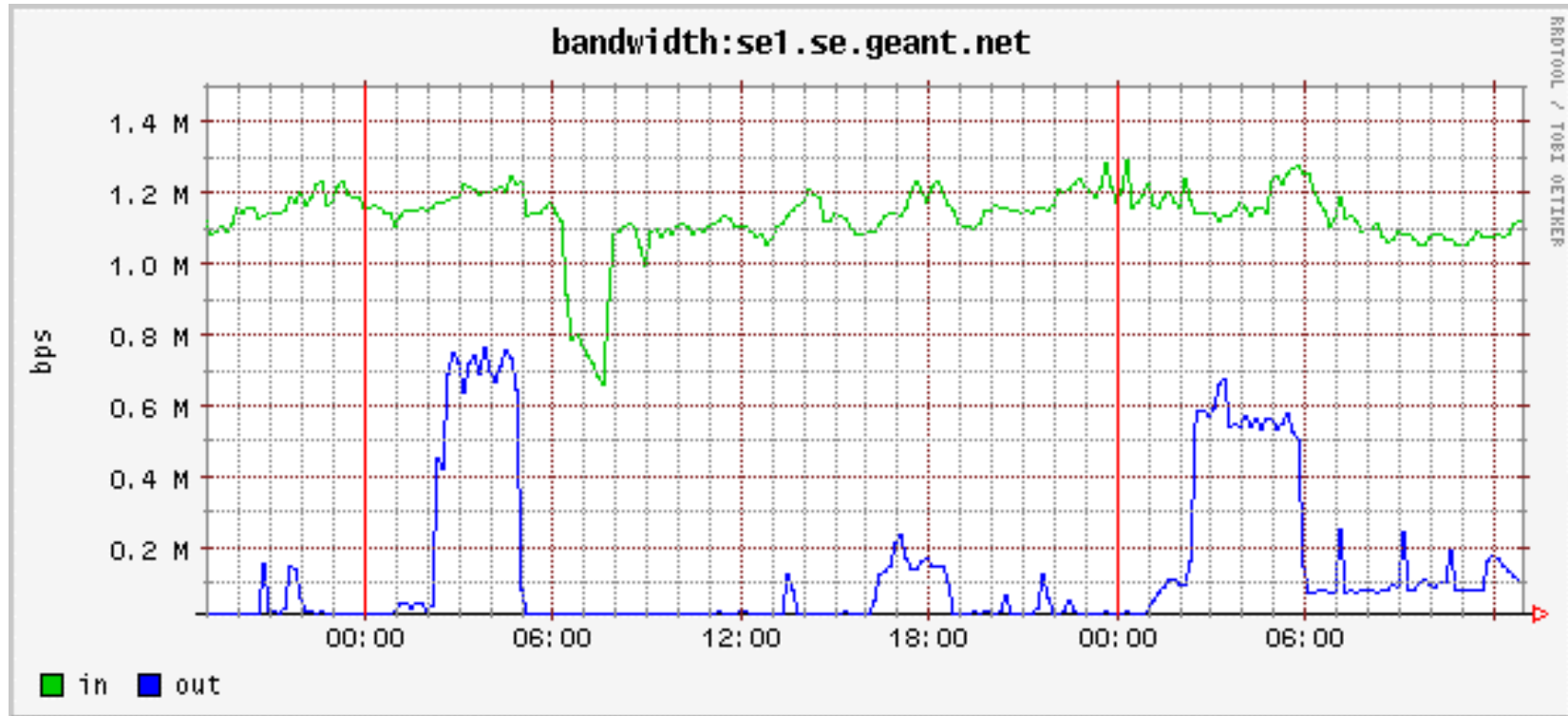
National Take up in Europe

- Most NRENs have national coverage of IPv6
 - dual stack or separate infrastructure
- Typically a small proportion of end-user sites are connected
 - on the increase....but....
 -many hurdles to overcome
- limited number of small islands having IPv6 on each desktop
 - usually specific projects, not “business as usual”

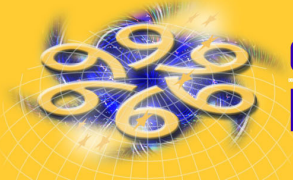




Usage



- Simple Graph ?



Are backbones the easy bit of the IPv6 challenge?



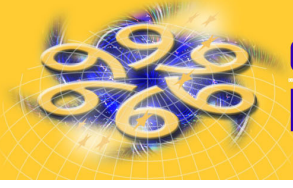
Technically complex

- ensuring dual-stack, performance, stability
- availability of simple performance data
- consistent routing (i.e 6to4 relays)

Usually limited scope

- “easy” for networks designed from scratch - like GÉANT

extremely difficult for networks with legacy and different equipment

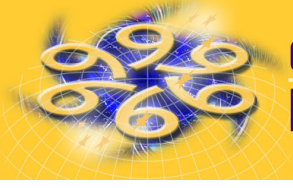


A tough impact !



- Investment
 - hardware
 - management
 - staff
- awareness/knowledge transfer beyond NREN staff is a challenge



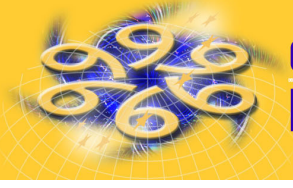


Advanced IPv6 ?



- IPv6 multicast - multidomain !
 - Backwards and forward
 - P.Savola draft
- QoS
 - *demos* available



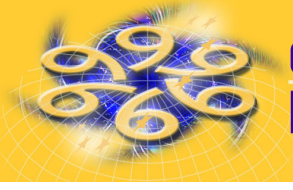


To Conclude



- Research Networks have an impact on IPv6
- GÉANT and NRENs lead the way through many years of joint work
- It is not simply plug&play - significant investment needed
- Concentration of expertise/knowledge - to be widely disseminated to enable broader take-up





Thank You !

