

# IPv6 Globus - Experiences

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# Outline

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- Benefits of IPv6
- IPv6 infrastructure
- IPv6 Grid
- Globus porting activities
- Test platforms and services
- Current status
- Future

# IPv6 Advantages

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- Bigger Address Space (128bits)
- End-to-end addressing – No NATs..
- Auto-configuration, renumbering
- Mobility Support (MIPv6)
- Potential benefits
  - Mandates IPsec Security
  - Hooks for QoS - FlowID
  - Modular design
    - Streamlined processing

# Platform Support for IPv6

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- IPv6-enabled network
  - IPv6-enabled Routers
    - Forwarding (in hardware), dynamic routing
  - IPv6-enabled network services
    - E.g. DNS, Email, Web, etc
- IPv6-enabled nodes
  - Broad Operating System support
  - IPv6 capable application API libraries
    - Java 1.4 IPv6 (JDK1.5 will provide for IPv6 WinXP)

# IPv6 Grids

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- Massive scaling potential
- Virtual Orgs networking simplified
- Auto-configuration
  - Resource discovery
  - Addressing
- Peer-to-peer communication Enabler
- Better Mobility support

# Porting Globus GT2 to IPv6

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- Mainly written in C
- Globus I/O (GIO) network functions
  - Worked on TCP and UDP porting
  - UoS started TCP, UCL continued both IP ports
- Fairly straightforward to make either IPv4 or IPv6. Dual support trickier.
- Work not finished due GT3 release

# Porting GT3 to IPv6

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- Written mainly in Java
- Check for IP protocol dependencies
  - GT3 protocols/APIs
  - GT3 source code
- Identify network related source code
  - IP addresses or URLs (see RFC2732)
  - Sockets, Name lookups, etc
- Configuration
  - Initialisation, runtime
  - DNS naming issues
- Globus XIO (GT2 C based) - GridFTP

# GT3 Protocols/APIs and IPv6

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- GridFTP has already been flagged
  - Apply RFC2428 “FTP extensions for IPv6 & NATs”
- Other protocols are being examined (inc COG kit)
  - IP protocol dependencies
  - Initialisation and runtime protocol choices
- Preferable to modify before standardisation
  - Extension documents also possible



# Associated Applications

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- IPv6 support required in associated apps
- Java Run-time Environment
  - JDK1.4 (Solaris/linux). (JDK1.5 planned for winXP)
    - Java IPv6 specific initialisation options
- JDBC (PostgreSQL) – Used by RFT
  - IPv6 Patch required – undergoing testing
- Container environments
  - Tomcat4 tested on IPv6
  - Websphere and .Net – coming soon

# IPv6 Porting Stages

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- IPv6-only
  - Minimal modifications
- IPv4 and IPv6 dual stack
  - Initialisation preferences
  - Runtime preferences
- IPv4-only and IPv6-only
  - Transition mechanisms
  - Application gateways

# Test Environment

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- Rack of 8 Linux Redhat-8.0 machines
- Installed GT3 alpha release
  - JDK1.4.1, Ant-1.5, Tomcat4LE
- Uses host/user certificates
- Packet level network monitoring
  - Loopback and LAN interfaces

# Test Services

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- Shipped GT3 test services
- GT3 OGSA service browser
- UCL projects
  - Material Simulation (EPSRC) – GT3
    - Modelling Aspirin molecule
  - E-protein (UK E-Science) – GT2
    - Genome Structure based annotation
  - Multimedia gateway in development
- GGF community services welcome

# Current Status

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- Work being done on 6Net project; UCL & UoS
- Initial tests – Started default container config & client on ipv6 addresses
  - IPv4 seen on loopback and LAN
- Config files set for IPv6
  - IPv6 only on LAN, IPv4 on loopback
- Tested GT3 Container and Tomcat4
- Testing IPv6 Postgresql
- Submitting to [bugzilla.globus.org](http://bugzilla.globus.org)

**Service Data Namespace:** 
**Name:** 
**Timeout:**

**Timeout(seconds):**

**Registry Inspection**

Description	Reference
Handle Resolver	http://frappuccino.ip6:-1/ogsa/services/core/handle/H
Notification Subscription Factory Service	http://frappuccino.ip6:-1/ogsa/services/core/notificati
Notification Subscription Service	http://frappuccino.ip6:-1/ogsa/services/core/notificati
Deactivated core/notification/SecureNotificationSubscriptionFactoryService	http://frappuccino.ip6:-1/ogsa/services/core/notificati
Deactivated core/notification/httpg/NotificationSubscriptionFactoryService	http://frappuccino.ip6:-1/ogsa/services/core/notificati
Deactivated ogsa/gram/FileStreamingFactoryFactoryService	http://frappuccino.ip6:-1/ogsa/services/ogsa/gram/Fil
Deactivated samples/registry/VORegistryService	http://frappuccino.ip6:-1/ogsa/services/samples/regis
Deactivated samples/counter/secure/CounterFactoryService	http://frappuccino.ip6:-1/ogsa/services/samples/coun

Auto update

# Future plans

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- Making Globus IPv6-enabled is only a beginning
- Operate with a variety of services over IPv6
- Looking at issues of mobility and security
- Investigate Transition/coexistence services

# IPv6 Links

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- [www.cs.ucl.ac.uk/staff/sjiang/](http://www.cs.ucl.ac.uk/staff/sjiang/)
- [www.6net.org](http://www.6net.org)
- [www.6winit.org](http://www.6winit.org)
- [www.ipv6.org/v6-apps.html](http://www.ipv6.org/v6-apps.html)
  - General patch repositories
  - Current available IPv6 APP



# Q & A

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