WORLD METEOROLOGICAL ORGANIZATION

COMMISSION FOR BASIC SYSTEMS
OPAG ON INFORMATION SYSTEMS & SERVICES
Expert Team on WIS-GTS Communication Techniques and Structure
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IPv6 Testing Status Update

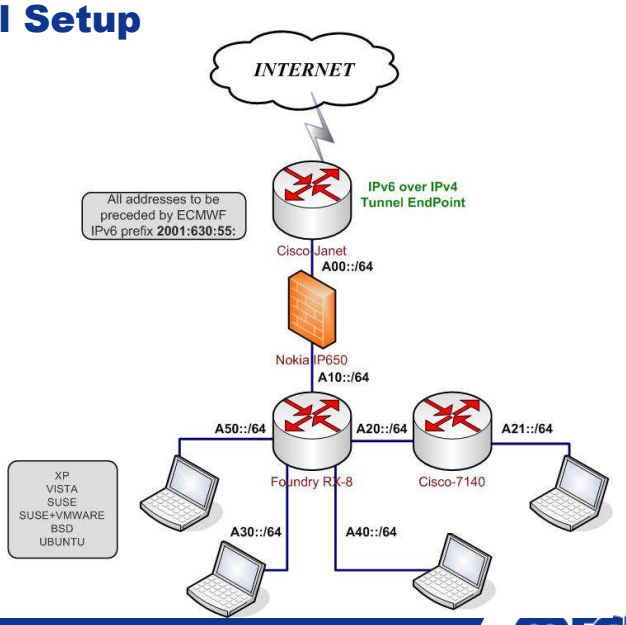
(Submitted by ECMWF)

Objectives and partners

- **To assess potential benefits and/or problems of deploying IPv6 in an operational environment.**
- **To assess IPv6 performance over existing infrastructure.**
- **Partners involved**

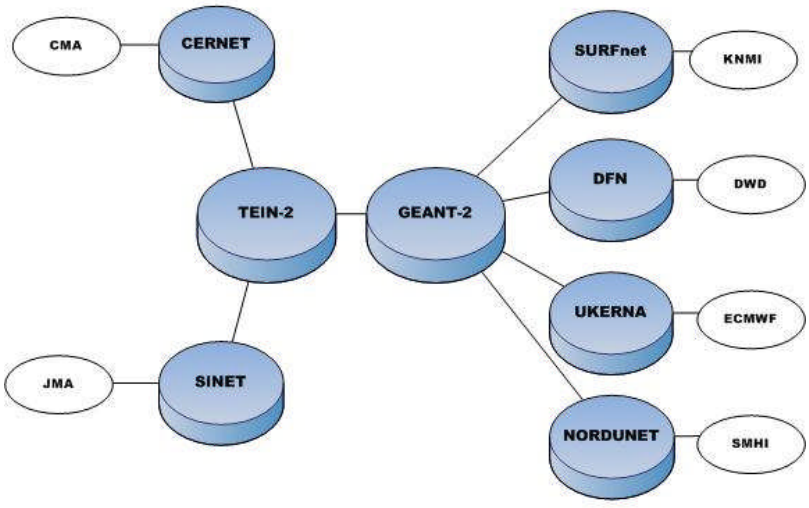
  CMA (China)
  CNR (Italy)
  DWD (Germany)
  JMA (Japan)
  KNMI (The Netherlands)
  SMHI (Sweden)
  ECMWF

Local Setup



ECMWF

Topology for external IPv6 tests



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External Tests description

- Ping
  - Record the round-trip time (RTT)
- Traceroute
  - Record IPv6 path.
- Iperf and ftp
  - Performance.
- HTTP and DNS
  - Sites accessing an Apache web server at ECMWF.

Initial results (1)

- Only a few tests have been completed.
- Sites did not have any major IPv6 basic connectivity problems with ISPs.
  - *Some sites connected with Pure IPv6*
  - *Others connected using IPv6 over IPv4 tunnels.*
- Firewalls are ready.
  - *Setting up the rule set is more difficult as every host will have multiple addresses.*
  - *Performance on a recycled Nokia610 was not very good but may have been caused by running iperf on a relatively slow desktop.*
- Not all applications are IPv6 ready yet, but for the main services such as DNS, web and ftp there is no problem.

Initial results (2)

- Plug and play is nice … but requires support staff to really understand IPv6 to solve problems.
  - ICMP6, neighbour discovery, router setup …
- Performance to/from European sites seems to be similar to IPv4
  - further tests are required.
- Performance to/from Asian countries seems a lot better
  - RTT to China is reduced by almost half
  - Iperf to JAPAN gave excellent results (>30Mbps).
  - Further tests are also required

Why is performance better ?

- Our initial guess is that
  - New IPv6 infrastructure, specially across Research Networks such as GEANT2, is in place but not fully used yet.
  - IPv6 routes may be more efficient than IPv4
    - Route from ECMWF to China is a textbook example
      - `JANET -> GEANT2 -> TEIN2 -> CERNET -> CMA`

What happens next

- Enable IPv6 operationally on some DMZ subnets.
- Enable IPv6 operationally on the main Firewalls.
- Modify ECMWF Dissemination transmission software (ECPDS) to be IPv6 capable (over the Internet).
- Modify ECACCESS to be IPv6 capable.

What will not happen … yet

- Not planning to deploy on the LAN
- Not planning to migrate from IPv4 but rather to complement it with additional IPv6 services.