ET-CTS 2014 Brasilia IPv6 Initiative Report

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Agenda

- Introduction to IPv6 Initiative Task
- Timeline and Activities
- Lessons Learned
- Next Steps

Task Mission

- Raising awareness of IPv6 within WMO community
- Establish a **capacity-building** strategy
- Review of WMO regulatory material

Background to IPv6

- Next-Generation protocol for the Internet
- Support many more devices (billions+)
- Less complex (expensive to implement) than IPv4
- Built-in mobility support

- Only option for new Internet connections in some locations
- Important for realizing the global vision of the WIS

Task Objectives

- Rolling assessment of IPv6 capabilities at WMO Members
- Pilot Project for exchange of meteorological data
- Update Technical Regulations where necessary
- Reporting to ET-CTS and CBS

Timeline

- 2012 – Establish Project Team
- **2013 – Survey, Pilot**
- 2014 – Draft reviewed documentation, Survey, Pilot
- 2015 – Approved reviewed documentation, Survey
- 2016 – IPv6 Task Force

Activities Review – 2012

- Design IPv6 Survey
- Prepare article for RTH Newsletter
- First Pilot teleconference

Activities Review – 2013

- Distribute IPv6 Survey
- Publish article in RTH Newsletter to promote Pilot
- Regular teleconferences for Pilot participants
- Pilot Phase 1

Pilot Project Mission

- Subproject of the IPv6 Initiative
- Gather and share technical experience of IPv6 in a non-operational environment
- Support other parts of the IPv6 Initiative such as documentation

Pilot Objectives

- (1a) Early adopters
- (1b) Wider WMO Community involvement

- (2a) Network layer communications
- (2b) Application (data) layer communications
- (2c) Bilateral data exchange between Pilot participants

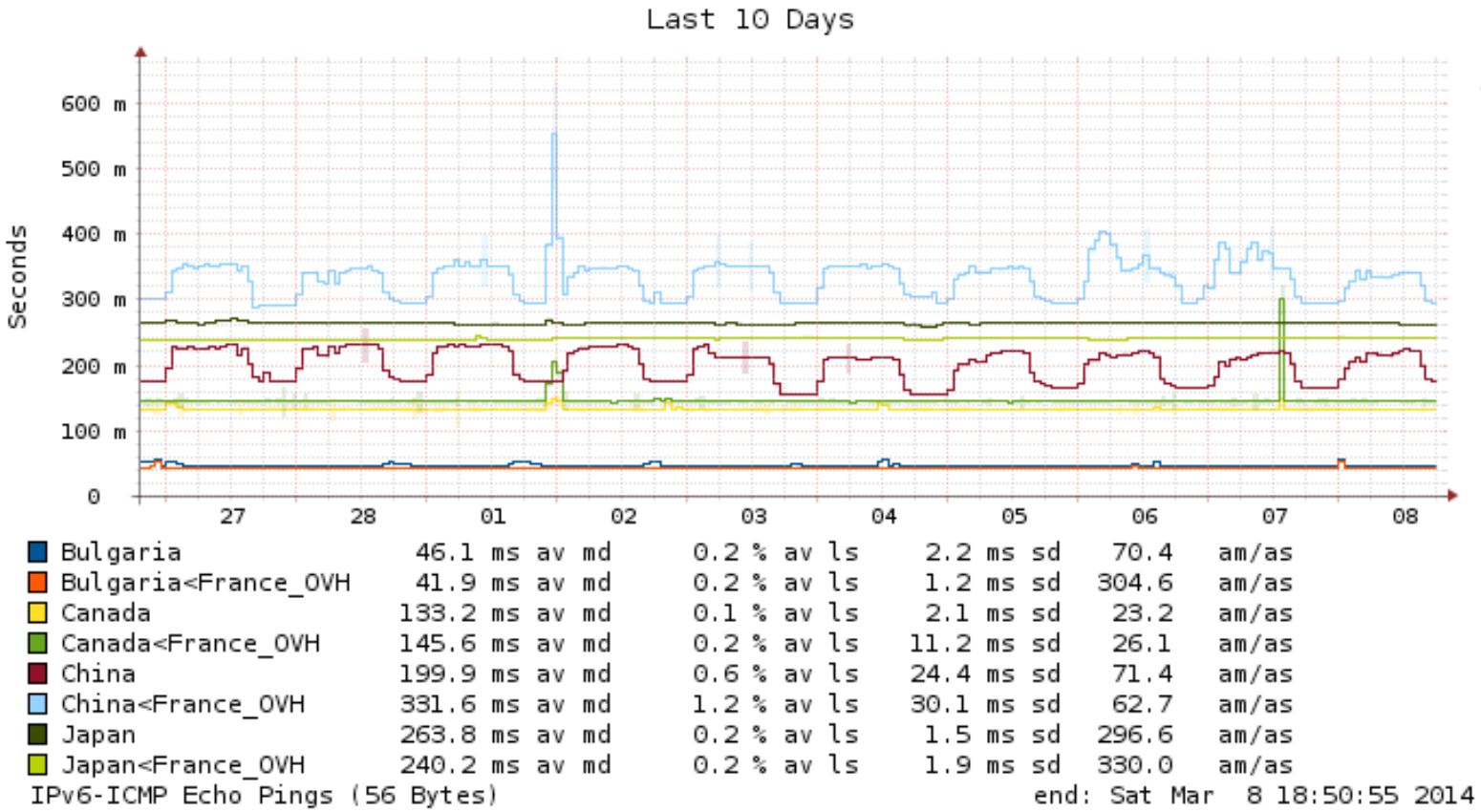
Pilot Participants so far… *(thank you!)*

- CMA (China)
- DWD (Germany)
- ECMWF
- Environment Canada
- INAMHI (Ecuador)
- JMA (Japan)
- Météo France
- NIMH (Bulgaria)

Pilot – Basic Communications

- "Joining" the pilot is simply having a reachable IPv6 address on the WMO wiki page
- All participants are monitored by ECMWF using ICMP Echo
- Latency and reliability are similar to IPv4 (even for tunneled sites)
- Firewalls can block this monitoring

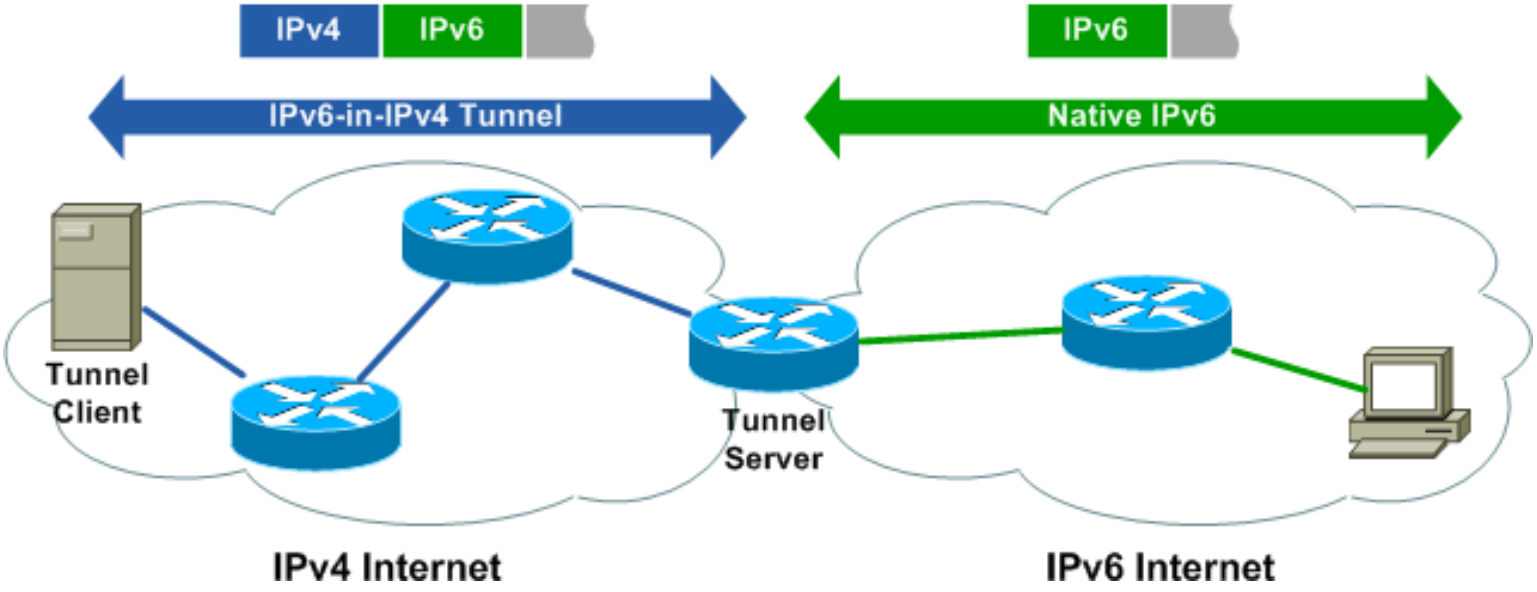
Pilot – Basic Communications (2)



Technical Note: IPv6 Tunnels

- Sites on National Research and Education Networks (NREN) can usually have native IPv6 service
- Tunneled service: IPv6 carried inside IPv4 to a third party with native IPv6 access
  - *RFC 3053 "Tunnel Broker" service is freely available*
  - *RFC 3056/6343 "6to4" is also common*
  - *Others… 6over4, DS-Lite, 6rd, ISATAP, NAT64/DNS64, Teredo, SIIT*
- Performance and reliability limited by the tunnel endpoint

Technical Note: IPv6 Tunnels (2)



Technical Note: TESLA

- Testing Services Linux Appliance
- Developed by ECMWF for RMDCN/Multicast testing
- Based on TurnKey Linux (Debian)
- Deploy as Live-CD or install as a VM or onto a server
- Simple menu at boot to configure public IPv6 address

Pilot – Data Exchange

- TESLA has basic proof-of-concept data exchange
  - Generates 50MB random data, files of different size
  - FTP copy to remote destination
  - md5sum check that files are OK
- *Pilot sites should establish bilateral data exchange agreements with other Pilot sites*, and agree on data transfer mechanism
- This has not yet happened (why?...)

Lessons Learned

- Different sites have **different technical, financial, staff capabilities**. Initiative plans should take this into account.
- **No bilateral data transfers** were established so far. Perhaps pilot participants would appreciate a technical/process framework document?
- Many published technical resources on IPv6. **Few non-technical resources**, e.g.:
  - Establishing a business case
  - Integrating IPv6 into an operational environment
  - Building support/helpdesk capacity
  - Structured approach to IPv6 deployment (hardware lifecycle, etc)

Business Case for IPv6

- Business Case is the most requested "missing document" from the wider (non-WMO) community using IPv6
- WMO IPv6 Initiative should make this a key deliverable
- Essential points (e.g.):
  - *IPv6 should be cost-neutral*
  - *IPv6 should bring operational advantages*
  - *IPv6 should not harm current operational activities*
- Involve all WMO Members but especially those with existing experience of IPv6 deployment, and the capacity to help

Broader Challenges for IPv6

- Still missing a strong Business Case
- Several technical aspects (RFCs) are still being developed
  - WAN is mature
  - LAN is immature
- Seen as more complex than IPv4
  - Not true! ☺

Plans for 2014 (and beyond)

- IPv6 Pilot
  - Try to kick-start bilateral data transfers
- Raising Awareness
  - Perhaps an "IPv6 advocate" per WMO region?
  - It's time for another survey
- Review Reference Materials
  - Attachment II.15
  - Manual on WIS Information Systems
- Prepare Draft Guidance Material
  - Non-technical document toolkit

Summary

- Technical successes in the Pilot
- Need to find ways to encourage activity (data transfers)
- Most challenges are non-technical

Thank You

Any Questions?