

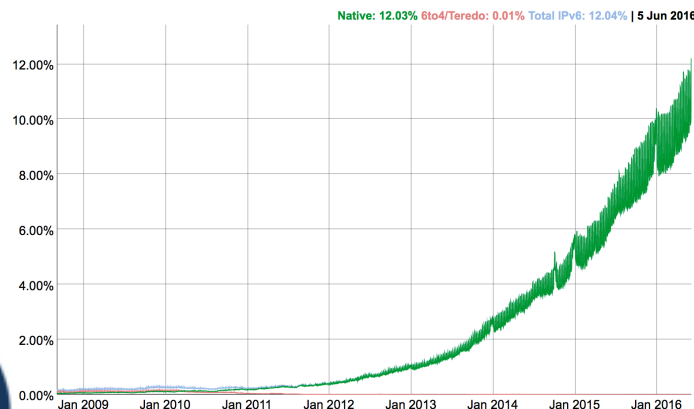
IPv6 only CPU Deployment Plan

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on behalf of the HEPiX IPv6 Working group

IPv6 status

People have been claiming that IPv6 deployment is just around the corner for the years, why should we believe you this time?

- IPv6 now makes up a significant amount of global internet traffic.
- Some commercial hosting companies offer cheaper IPv6 only services[1].
- Apple now mandates all Apps submitted to the App Store must support IPv6-only networking[2].



[1] <https://www.mythic-beasts.com/servers/virtual>

[2] <https://developer.apple.com/news/?id=05042016a>



WLCG readiness

As a whole, the WLCG is significantly behind where it should be in terms of IPv6 readiness.

- The pressure to upgrade to IPv6 is (in general) from those with the smallest voice:
 - Smaller sites that only got assigned a handful of IPv4 address.
 - Commercial providers with whom VOs are still developing ways to utilize their resources.
 - Opportunistic resources.
- A small number of larger sites (including CERN) have made an outstanding effort to get us to where we are today.



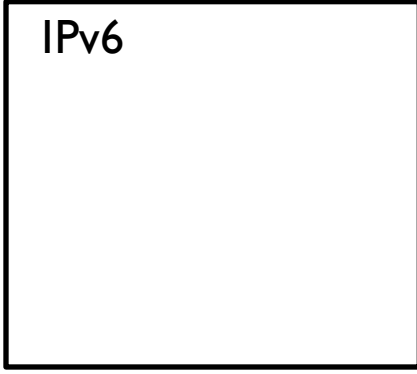
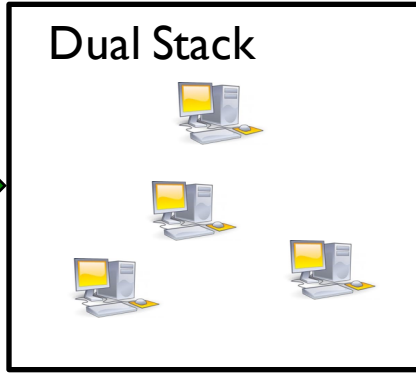
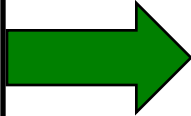
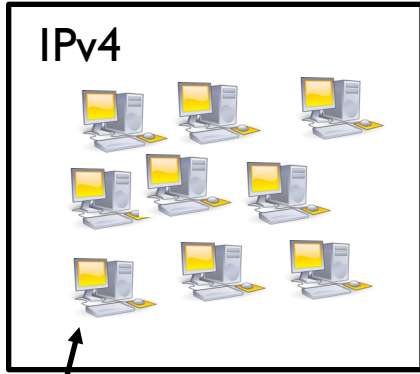
IPv6 Goal

- The eventual goal is for IPv6 to completely replace IPv4.
- Running dual stack services is extra work over just one protocol.
 - Minimize the number of services that need to be run as dual stack
 - Provide a complete upgrade path so that sites can plan appropriately.
- Sites may use an IPv6 upgrade to re-architecture their entire network.
- CPU resources is the easiest thing to make IPv6 only
 - We will need dual stack storage and Central Services.

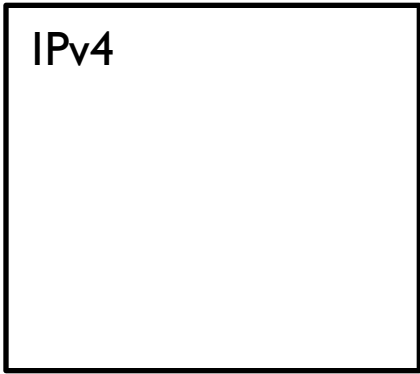


Possible upgrade path

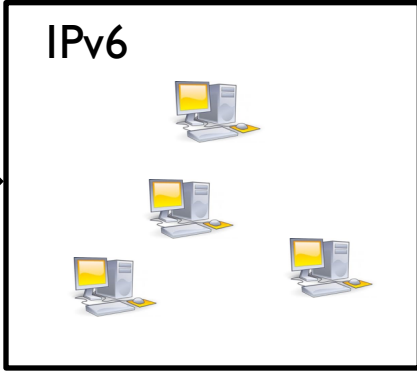
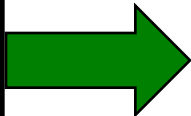
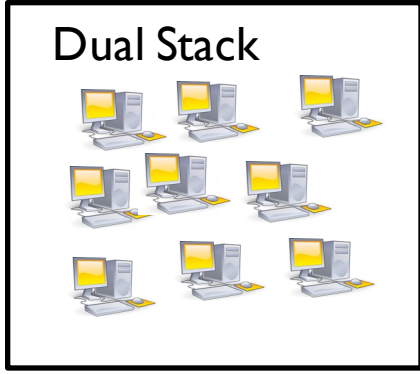
Initial



Final



Site



Upgrade path

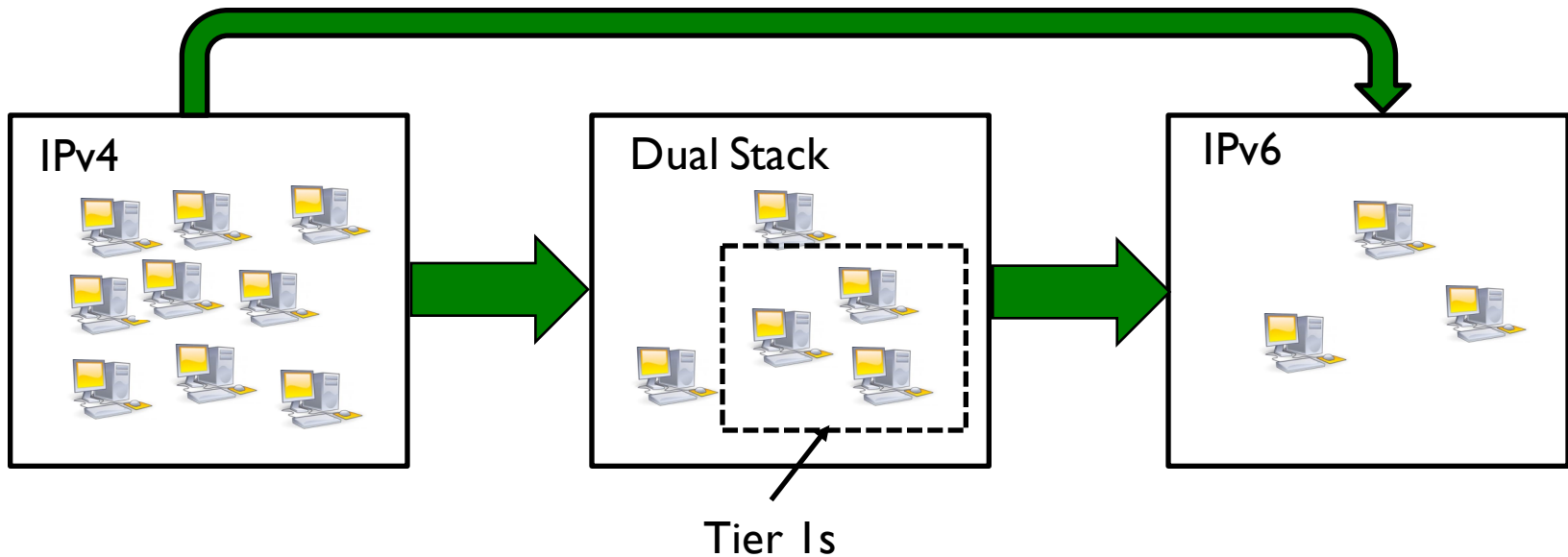


We cannot wait for all sites to migrate to dual stack before permitting IPv6 only resources.



Required upgrade path

Some (smaller) sites can upgrade directly



We will require leadership facilities to support dual stack services to allow other sites to upgrade



Software status

Is the WLCG Software stack IPv6 ready?

- The HEPiX IPv6 group has tested a large amount of software for IPv6 compliance.
- Key storage software and protocols work:
 - dCache, DPM
 - XrootD 4, GridFTP, http
- Enough has been shown to work to allow most LHC VO workflows to run over IPv6.
- Software developers need to be making sure that their software is IPv6 ready.
 - If we haven't heard from developers by now, VO need to be dropping usage of it.
- We are not aware of any blocking issues with software.



IPv6 only CPU plan

The HEPiX IPv6 group has been trying to come up with a formal plan to allow sites to migrate their CPU resources to IPv6 only by April 2017.

- Significant progress has been made towards this goal.
- We have not managed to get full agreement on all issues from the VOs.
 - Primarily on how many sites need to be dual stack before the VO is comfortable in allowing IPv6 only.
- Many things we do agree on.
- While it is important to provide sites with the option to upgrade to IPv6, we do not expect a large initial take up.
 - If a site wished to upgrade CPU to IPv6 only by next year I believe we could come to an individual agreement.



Agreements

- All VOs encourage sites to upgrade their storage to dual stack.
- All VOs are working towards making their central services required by Grid jobs dual stack by April 2017.
- Shared central services (e.g. CVMFS) should be accessible via IPv6 by April 2017.
- Tier 1s should provide functional dual stack access to storage (and other services they may run):
 - 1GB/s and 90% availability by April 2017.
 - 10Gb/s and 95% availability by April 2018.



Conclusion

- IPv6 is finally becoming main stream.
- The WLCG is behind for IPv6 deployment.
- We have a plan to allow IPv6 only CPU resources at sites.
- Will circulate official document as soon as possible.

