



# IETF Update

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# IETF WGs

## ■ NTP WG

- NTP WG is closing down with the finishing up of NTPv4 work

## ■ TICTOC WG

- TICTOC is responsible for all new timing related work in IETF



# Network Time Protocol (NTP)

- NTP grew out of work done by Dr. David Mills at the University of Delaware.
  - Previous versions: 1985 - NTPv0 (RFC 958), 1988 - NTPv1 (RFC 1059), 1989 - NTPv2 (RFC 1119)
  - Current version: 1992 - NTPv3 (RFC1305)
  - The NTP architecture, protocol and algorithms have been evolved over the last twenty plus years.
  
- NTP Implementation Status: Millions of NTP peers deployed worldwide.
  - Well managed NTP provides accuracies of low tens of milliseconds to submicroseconds.
  - NTP daemon ported to almost every workstation and server platform available today.



# IETF NTP WG

- NTP initially developed outside the structure of the IETF
  - Current definitive documents (RFC 1305 and RFC 4330) were independent submissions from Dr. Mills
  
- The Internet Engineering Task Force (IETF) NTP WG was chartered in March 2005 to develop an NTPv4 specification to include:
  - Updated NTPv4 algorithms, IPv6 support, Enhanced Security
  - SNTP (Simple Network Time Protocol)
  - An NTP MIB (for monitoring and management via SNMP)



# NTP WG – Standardization Status

- Status:
  - Three drafts completed by the NTP WG and submitted to the IESG
    - Protocol and Algorithms ([internet-drafts/draft-ietf-ntp-ntp4-proto-11.txt](#))
    - Autokey ([draft-ietf-ntp-ntp4-mib-05.txt](#))
    - MIB ([draft-ietf-ntp-autokey-04.txt](#))
  - One draft in NTP WG Last Call
    - DHCP options ([draft-ietf-ntp-dhcpv6-ntp-opt-02.txt](#))
  - Plan to complete efforts by the end of 2008
    - Completes full update to NTP specifications
  
- Potential NTP related future work items to be addressed in the IETF TICTOC WG
  - Faster polling intervals
  - Follow-up message capabilities
  - Alternative local clock algorithms



# IETF TICTOC WG History

- IETF recognizes that a next generation timing over IP (and potentially MPLS) is required.
  - Where timing means both frequency and time
  
- TICTOC has been an IETF WG since March 2008.



# IETF TICTOC WG Status

- TICTOC has been very aggressively scheduled.
- Work is in progress on:
  - *problem statement*
  - *modularization draft*
  - requirements draft
  - architecture draft



# IETF TICTOC WG Tasks

- TICTOC is collecting requirements for various applications

- CES
- Cellular backhauling
- Remote Telco
- Instrumentation and Measurement
- Industrial
- Automation
- Electrical power distribution
- Misc. Networking
- Legal Time
- Metrology
- Sensor networks

Participation is invited from experts in any of these areas !

- and will analyze the suitability of the present solutions

- IETF NTP (including possible extensions)
- IEEE 1588-2008 (including defining profile(s))





# TICTOC Charter

- Develop IEEE 1588-2008 profile(s) for time and frequency distribution for network infrastructures with primary focus on well-engineered SP and private networks.
  - “On-path support” with specialized hardware may be expected to be available at one or more hops on a given path.
  
- Develop extensions to NTPv4 with a primary focus on individual hosts and devices on the public Internet requiring functionality or performance not currently available in NTP.
  - “On-path support” may be utilized if available, but is not expected.



# Types of on-path support

- Link support, for instance:
  - a SyncE link
  - a POS path with frequency available to user
  - a DSL link with NTR
  
- Network node support, for instance:
  - a network element with local frequency (e.g. atomic clock)
  - a network element with local time (e.g. GPS)
  - a boundary clock or equivalent (e.g. NTP stratum server)
  - a transparent clock or equivalent



# Other work items

TICTOC is also looking into :

- media mappings for IETF network technologies
- coexistence of NTP and 1588
- security issues
- management (MIBs)
- discovery of “on-path support” elements
- optimizing path selection for performance
- traversal of NATs and firewalls



# References

- <http://www.ietf.org/html.charters/tictoc-charter.html>
- <http://www.ietf.org/html.charters/ntp-charter.html>
- Synchronization in Packet Networks; IETF NTPv4 and IEEE Std 1588-2008
  - Karen O'Donoghue; ITSF'07