



Carrier Ethernet Service Life-Cycle Management

Anthony Magee, 6th September 2013

Agenda



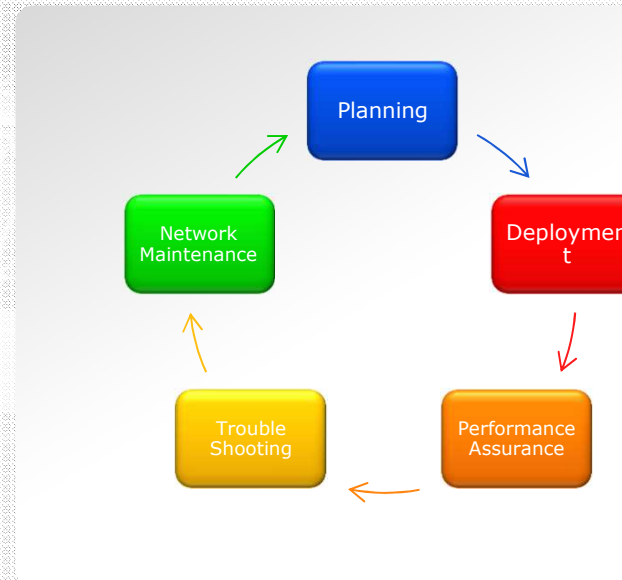
- Service-Lifecycle
- Service Level Agreement – Tools/Standards
- Enabling Technologies
- Summary – Bringing it all together

Service Life-Cycle



The Service Life-Cycle

- Planning
 - Resources, tools, reporting
- Deployment/Installation
 - Physical, Service Layer
- Performance Assurance
 - In-Service monitoring/reporting
- Trouble-shooting
 - Alarms, Fault identification
- Network Maintenance
 - Scheduled operations



SLA tools should support the whole service life-cycle

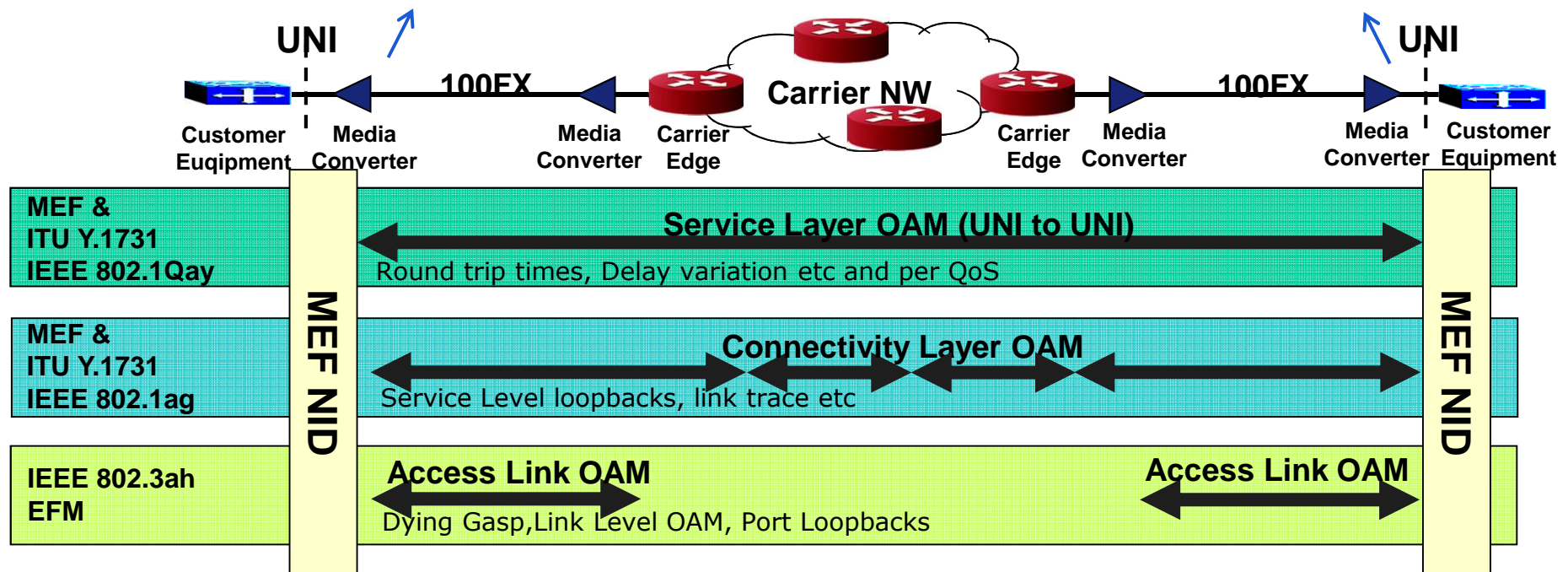
Service Level Agreement Tools



Ethernet OAM - Areas of standards activities



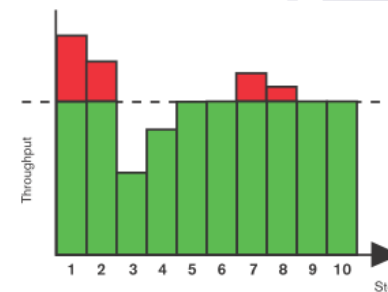
Benchmarking Tests RFC 2544 & Emerging ITU-T Y.1564



RFC 2544 LAN Benchmarking



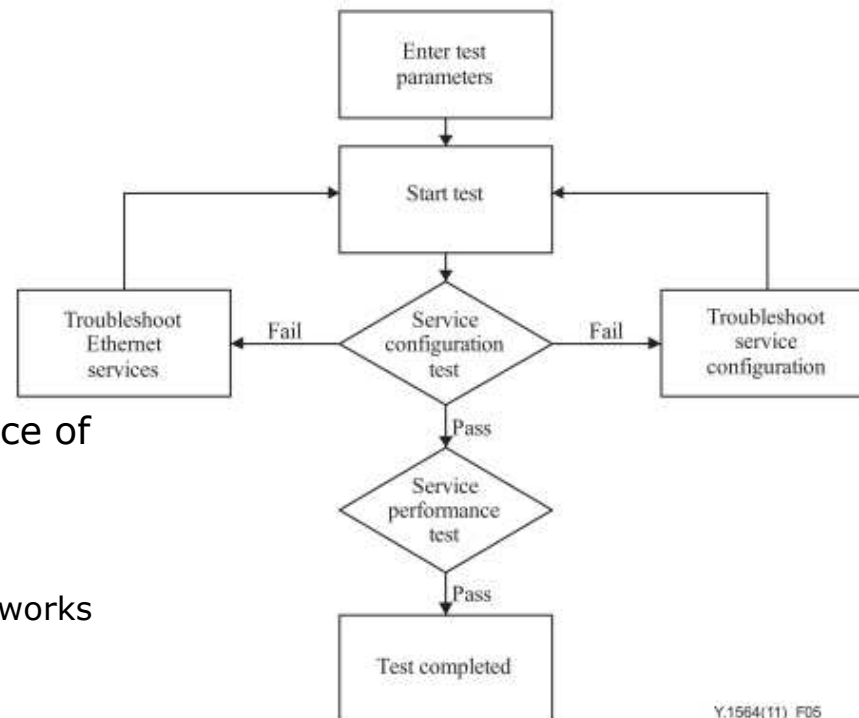
- IETF RFC 2544
 - Widely used test methodology – by vendors in lab
 - LAN Benchmarking history
 - Tests included throughput, latency, burst and frame loss
 - Algorithm - test at max, back off until pass, then increase until fail
 - Tools made available to network operators
 - When used in the WAN environment – feedback... “Time Consuming”
 - Average of about 20 mins per test
 - Also lacking test capability which reflect the maturing SLA
 - No support for per VLAN/Per Service - really only a port based tool
 - No support for PDV, or QoS measurements
 - Test for concurrent services not supported, RFC 2544 sequentially tests different ports and different directions
- Need for a new standard - (ITU-T Y.1564)
 - Reduce test time - couple of minutes per service, and service concurrency
 - Improve test coverage – PDV, QoS



Y.1564 (Service Activation Testing)



- Two Test Modes
 - Configuration test
 - Very quickly verify service
 - QoS parameters being met?
 - Seconds/minutes
 - Performance test
 - Verify and report on performance of multiple services concurrently
 - Minutes/hours
 - 15 minutes, 2 hours, 24 hours – catering for different types of networks
 - ▶ Configurable

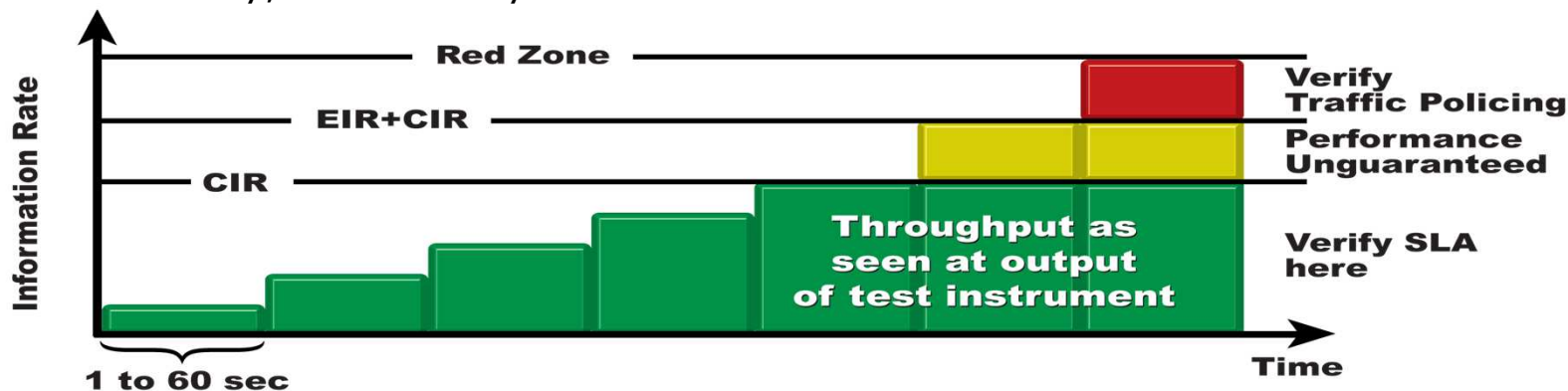


Y.1564(11)_F05

Y.1564 Service Configuration Test



- Verify throughput performance for each service at CIR, CIR+EIR and above
 - Tests up to CIR to verify committed SLA parameters
 - Then increase the traffic rate into the red zone to verify policing
 - Performance is uncertain in the yellow zone and needn't be checked
 - Optional CBS/EBS configuration verification
- All SLA performance parameters measured at the same time
 - Frame Delay, Frame Delay Variation and Frame Loss



Y.1564 Service Performance Test



- Simultaneously validate SLA conformance for all defined services
- Generate traffic at CIR for all flows and report performance
- Test for 15 minutes to 24 hours
 - Configurable parameter

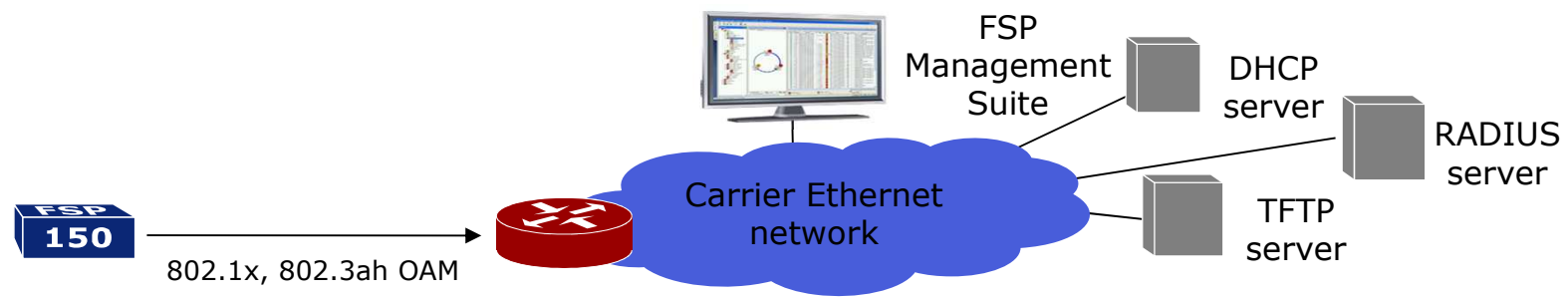


Enabling Technologies



Low-touch provisioning toolkit

for simple, quick and automated installation



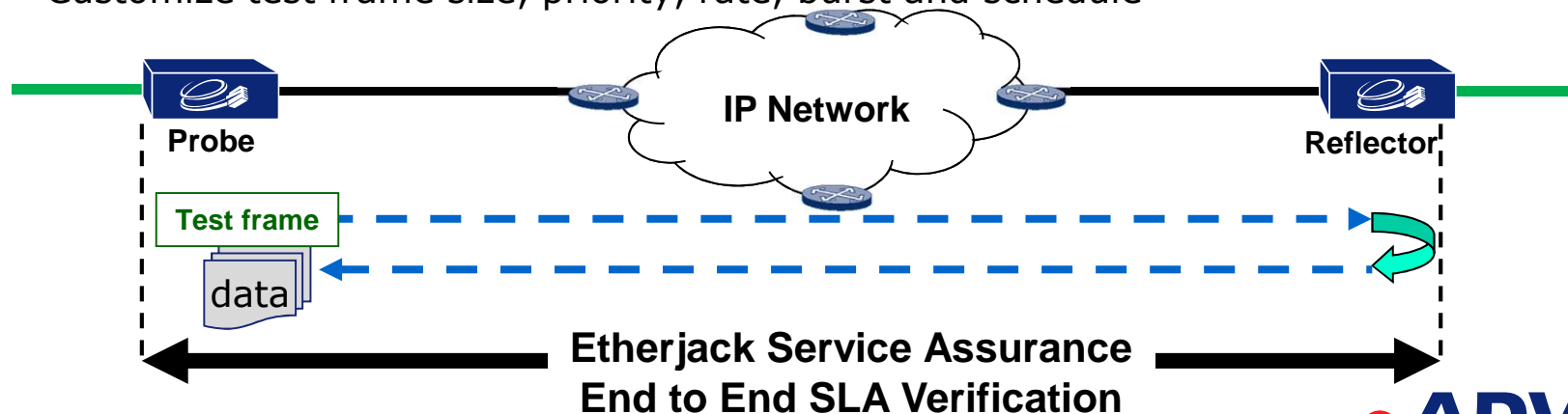
- ▶ Device only allowed to join network following RADIUS authentication
 - ▶ IEEE 802.1x Ethernet port authentication
- ▶ Detect link up and discovery of remote devices, initial tests and diagnosis
 - ▶ IEEE 802.3ah Ethernet in the First Mile (EFM)
- ▶ Get IP address and location/name of boot file to download config
 - ▶ Dynamic Host Configuration Protocol (DHCP)
- ▶ Download latest software and site specific config (IP setup for DCN etc.)
 - ▶ Trivial File Transfer Protocol (TFTP)

Etherjack™ Service Assurance (ESA)

End-to-end SLA performance monitoring

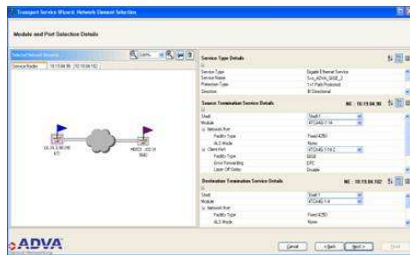


- In-service measurement of frame loss, delay and jitter
- Multiple options for synthetic test frames
 - Y.1731 DMM/DMR (with LMM/LMR for loss measurement)
 - Y.1731 SLM
 - IP ICMP Timestamp
 - IP ICMP Echo
 - IP UDP Echo
- Customize test frame size, priority, rate, burst and schedule

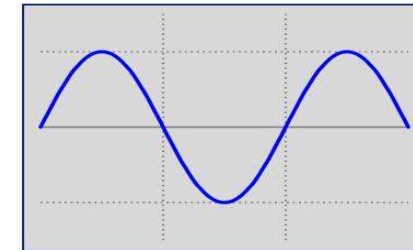
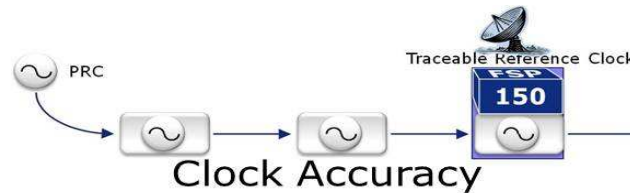


Synchronization Service Verification

Syncjack™ - SLA Tool Suite

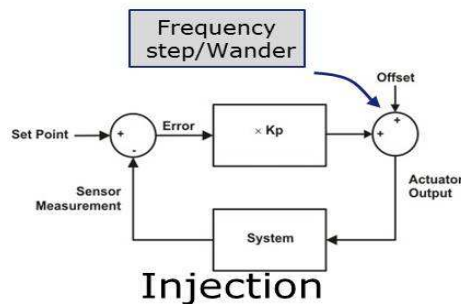


Mapping

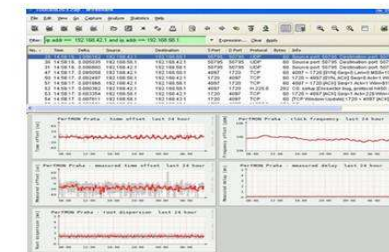


Clock Analysis

- > Mapping
 - > Sync distribution topology / status
- > Clock Accuracy
 - > Frequency and phase accuracy
- > Clock Analysis
 - > Clock performance monitoring
- > PTP Network Analysis
 - > PTP path monitoring / testing
- > Injection
 - > Check locking of slaves to masters



Injection

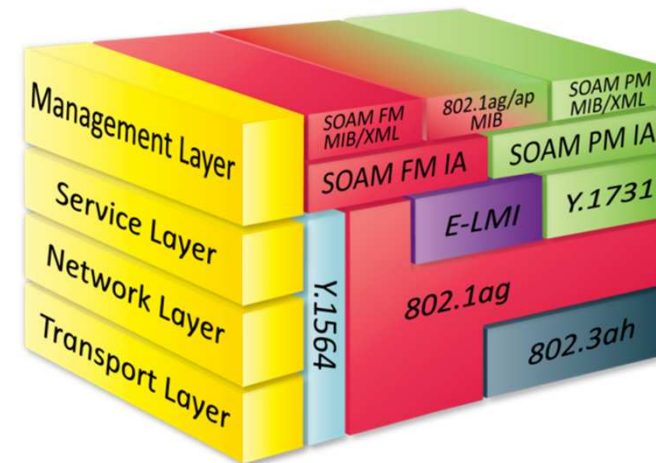
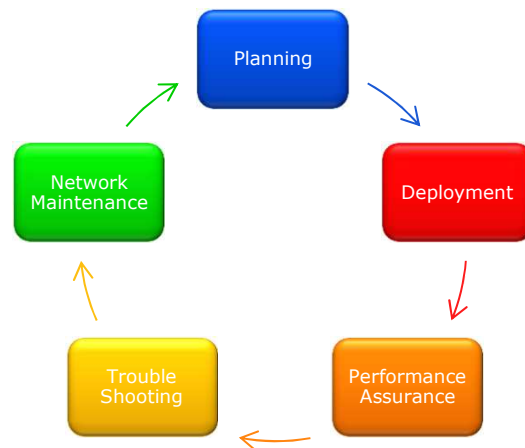


PTP Network Analysis

Bringing it all together



Service Life-Cycle & SLA Tools



SLA tools proven, support full life-cycle – ready for volume deployment!



Thank you

amagee@advaoptical.com



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