Residential 802.1 Bridging

Definition and documentation

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Summary

- The purpose of PARs
- Some .1 style observations
- Objectives for this meeting
- Some .1 goals and developments
- .1 compatible technical architecture
- .1 compatible documentation architecture

The purpose of PARs

- A PAR authorizes a ‘project’, i.e. the writing or amendment of one document
  - Not required for exploratory work
- A PAR scopes a project, defending against
  - Delays due to scope creep
  - Endless argument about what was meant/agreed
  - Mindless horse-trading

Some .1 style observations

- Heavily consensus based and driven
  - Recourse to formal voting to decide issues is rare
  - Never in task groups
  - Years of avoiding short-term manipulation
- The production of the standard is the process
  - The test of consensus is draft balloting
  - The final test of consensus is WG draft ballot
  - Very rarely vote about anything else
- Strong preference for very tightly focused PARs
  - Fundamental project management
  - Avoids fears, public positioning, delays
  - What you see is what you'll get
  - Continuous step by step development

Objectives for this meeting

- Develop a proposal for 802.1 consideration
  - To support ‘Residential Bridging’ applications
  - What existing 802.1 documents/parts of docs need to be modified
  - What new 802.1 standards are required
  - What additional supporting standards are required or assumed

Some .1 goals

- Broad applicability across applications
  - Clearly identify common base solutions
- Leave no undercutting economic alternative
- Don’t mortgage the future
  - Very wary of architectural oddities that constrain future developments
- Don’t destroy the present and its growth
  - Continuous compatible development

Some related .1 developments

- Rapid reconfiguration (in .1D/.1Q)
  - Minimize complex binding of resources to paths
- P802.1ad & 802.1Q-REV
  - Drop precedence and flow metering
- P802.1AQ Shortest Path Bridging
  - Remove single spanning tree requirement
  - Without complex management
  - May supplant GVRP/MVRP in some areas
- P802.1ag Connectivity Fault Management
  - Simple inband tools for checking connectivity
- P802.1ak Multiple Registration Protocol
- Other potential ‘class of service’ proposals

.1 compatible technical architecture

- Strong emphasis on hard shell/soft core network
  - Very simple class-based forwarding functions
  - Admission control / rate control / policing at edge
  - No flow control state within network
- QoS as a set of successive improvements and approximations
  - 100% loading never achievable
  - But performance bounds can be realized

Technical architecture elements

- Bridge
  - Performance
  - Flow metering and drop precedence
    - » Admission control and traffic profile enforcement
  - Class-based queuing
  - Queue service algorithms
- End station
  - Class based admission control
  - Frame class/priority marking
  - Admission control / traffic profile enforcement
    - » Not heavy tailed or even Poisson
  - ‘Management’ / ‘user’ reporting

.1 compatible document architecture

- Maximize leverage of existing applicable items
  - Piece parts and placeholders already in .1Q
- Set out the whole application and assumptions
  - Possibly a Recommended Practice
  - Possibly a .1Q Informative Annex
  - Clarify the need for non-transport, non-802 elements
  - A possible record of Technical Architecture
- End-station behaviors
  - Possibly in .1Q, possibly separate standard
  - Opportunity to leverage recent .3 rate control work?

Document architecture elements

- Bridge performance
  - .1D 16.1, 16.2 (much to be done)
- Flow metering (and policing)
  - .1Q 8.6.5 and potential Annex addition
  - Include definition of what bandwidth = X means
- Use of classes and class-based queues
  - .1Q Annex G additions and ‘application profiling’
- Queue service (transmission selection) algorithms
  - .1Q 8.6.8 and potential Annex addition
- Residential real-time ‘domain’ identification
  - Document where?
- Admission control protocol
  - Large separable item *once* metering/policing units decided

Why focus on the documentation

- Until written down, what is to be done is not clear
- Until written and integrated, impacts are not clear
- Until clear, false fears and hopes dominate
- Most of every project that adds or modifies occurs after it is thought technically ‘complete’
- Opportunities for staged completion
- Begin with the end in mind!

Questions

Common currency admission control

- Summing different traffic profiles is difficult
- ‘Synchronous’ networks have it easy
  - One small common unit of bandwidth
  - Units in = units out in short time period
- Learn from this
  - Admit flows with bandwidth *x/t*, no more than *x* bytes in system wide common interval *t*
  - Police with meter at network edge
  - In interval *t* at any node, units in ~ units out
  - More bursty flows equivalent to higher bandwidth
  - Simple sums, bounded calculable delays
  - Choose 1/*t* ~ 8 kHz (?)