

Next Steps in Signalling (NSIS) QoS Applications

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Acknowledgements

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- This slide set reuses slides from past IETF presentations (GIMPS and QSPEC).
- QSPEC slides have been contributed by Jerry Ash, Cornelia Kappler and Attila Báder.

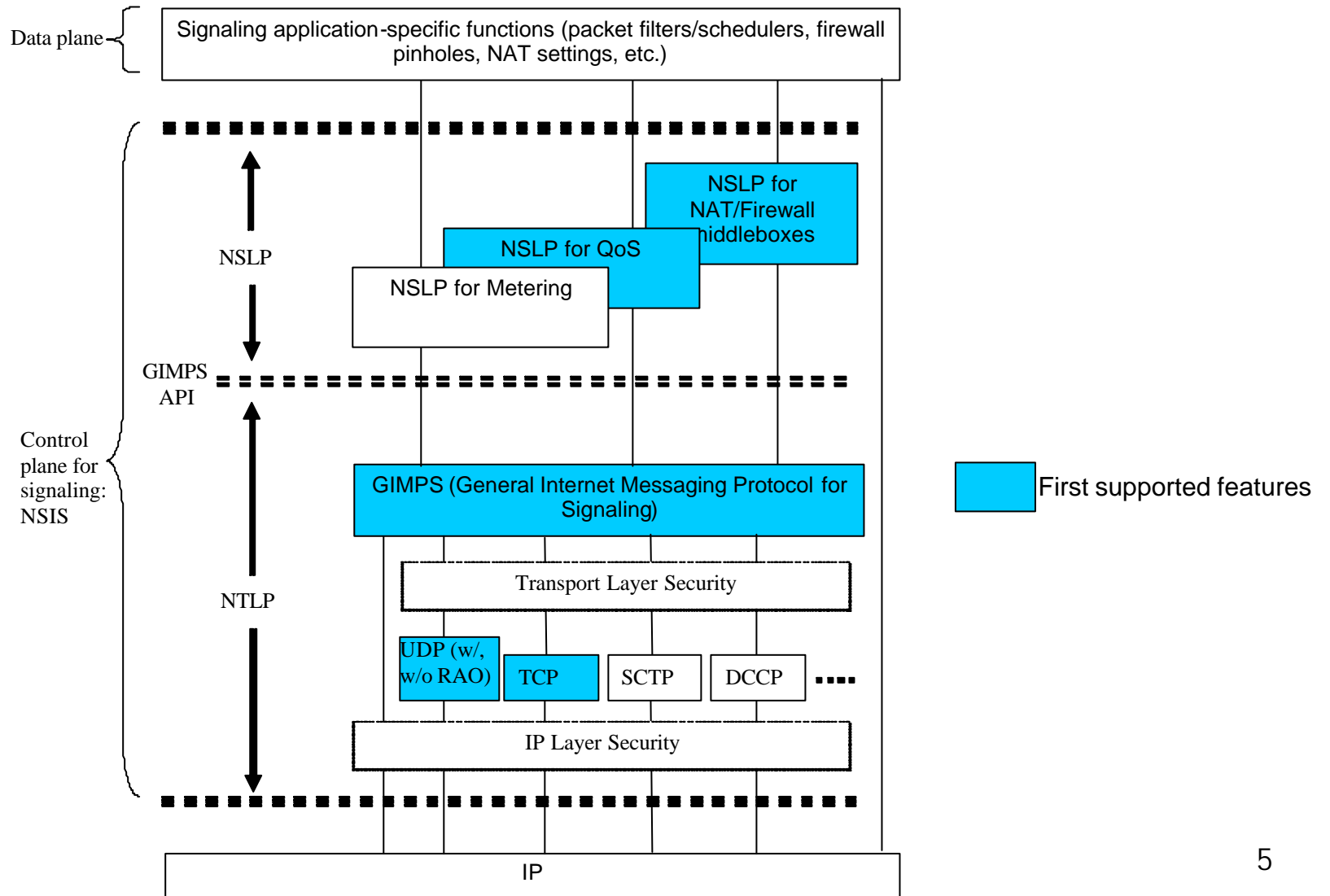
NSIS – High-Level Overview

- IETF WG (founded 11/2001) with a strong QoS signaling focus
- Later path-coupled NAT/Firewall signaling was added to show generic applicability
- Main current work items:
 - [GIMPS: General Internet Messaging Protocol for Signaling](#)
 - [NSLP for Quality-of-Service signaling](#)
 - [A NAT/Firewall NSIS Signaling Layer Protocol \(NSLP\)](#)
- Finished already:
 - [Requirements for Signaling Protocols \(RFC 3726\)](#)
 - [Requirements of a Quality of Service \(QoS\) Solution for Mobile IP \(RFC 3583\)](#)
- In the queue:
 - [Next Steps in Signaling: Framework](#)
 - [Security Threats for NSIS](#)
 - [RSVP Security Properties](#)
 - [Analysis of Existing Quality of Service Signaling Protocols](#)

NSIS Features

- Path-coupled:
 - Signaling message follow data path
 - Separation of discovery and signaling message delivery provided
- No multicast support
- Mechanisms to deal with mobility
- Ability to reuse existing security protocols
- Support for various signaling scenarios (not only e2e)
- Two layer architecture:
 - NTLP: carries signaling messages between neighboring peers
 - NSLPs: provide signaling application functionality (e.g., QoS signaling)
- Scalability:
 - Per-flow vs. per-aggregate reservations
 - Different QoS models in different domains
 - GIMPS without establishment of reverse routing state

NSIS Layering

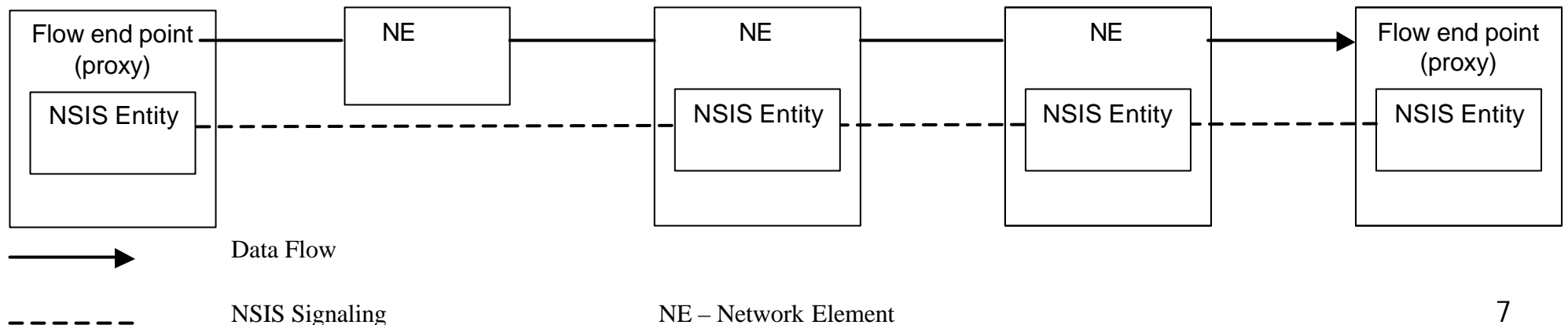


QoS NSLP

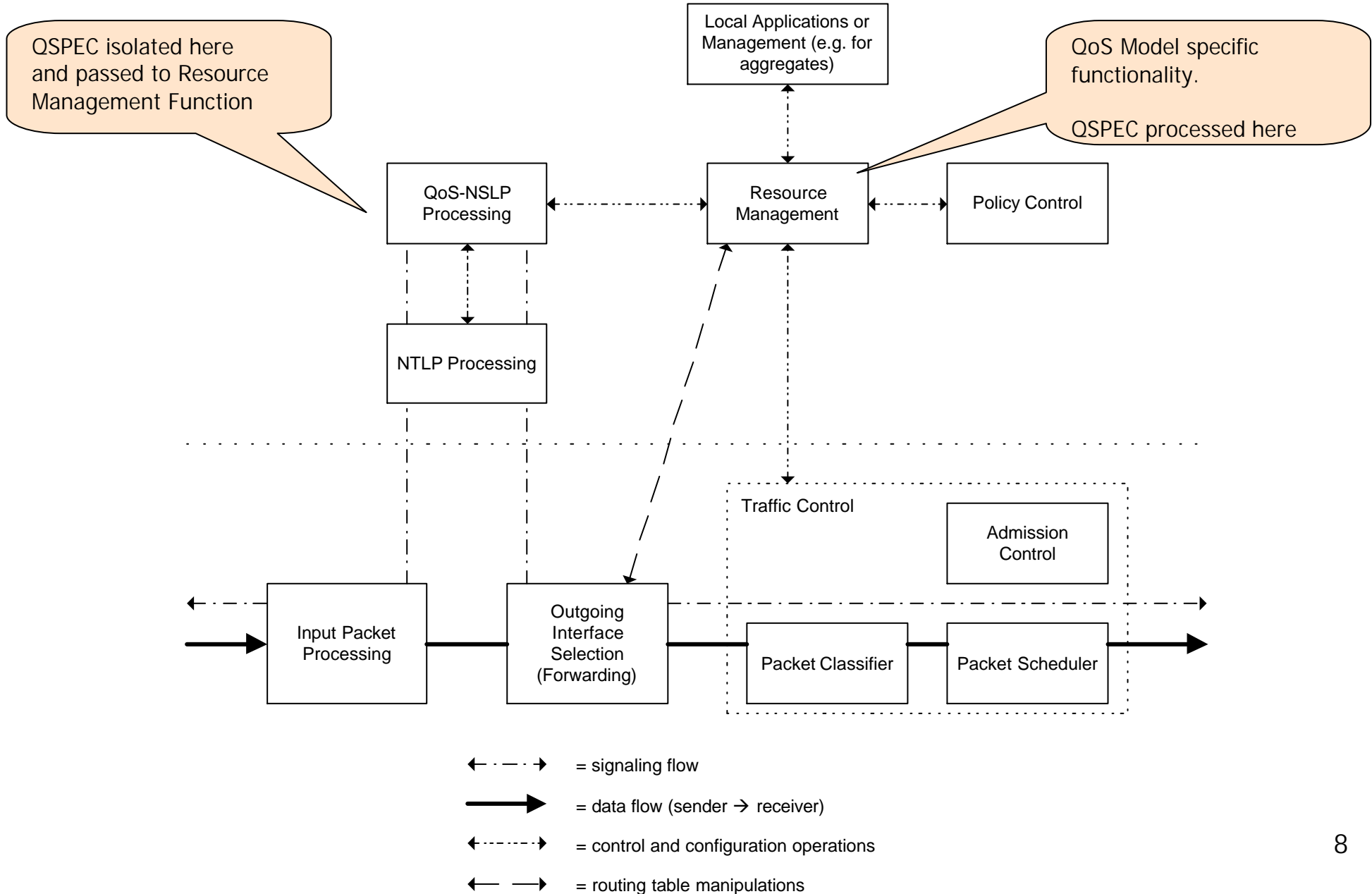
- Idea: Learn from RSVP and other QoS signaling protocols
- QoS NSLP defines signaling message types and their processing
 - Sender / Receiver-initiated, bidirectional reservations
 - Various authorization aspects (might require interaction with AAA infrastructure)
 - All QoS Model specific information is encapsulated in an object: the *QSPEC*
- QoS NSLP can signal for any “QoS Model”
 - QoS Model is a method for achieving QoS
 - E.g. IntServ, DiffServ, Y.1541,...
- QSPEC Template Idea:
 - Define generic parameters that are understood by everyone
 - Provide generic description for QoS model
 - Support heterogeneous QoS environments

QoS NSLP signaling model

- QoS NSLP signaling results in resource reservation along the path of a packet flow
- QoS NSLP messages...
 - ...are initiated by (a proxy of) the flow end point
 - ...travel along the flow path
 - ...are interpreted by NSIS entities on the data path
 - ? resulting in resource reservation
 - ... are terminated by (a proxy of) the other flow end point

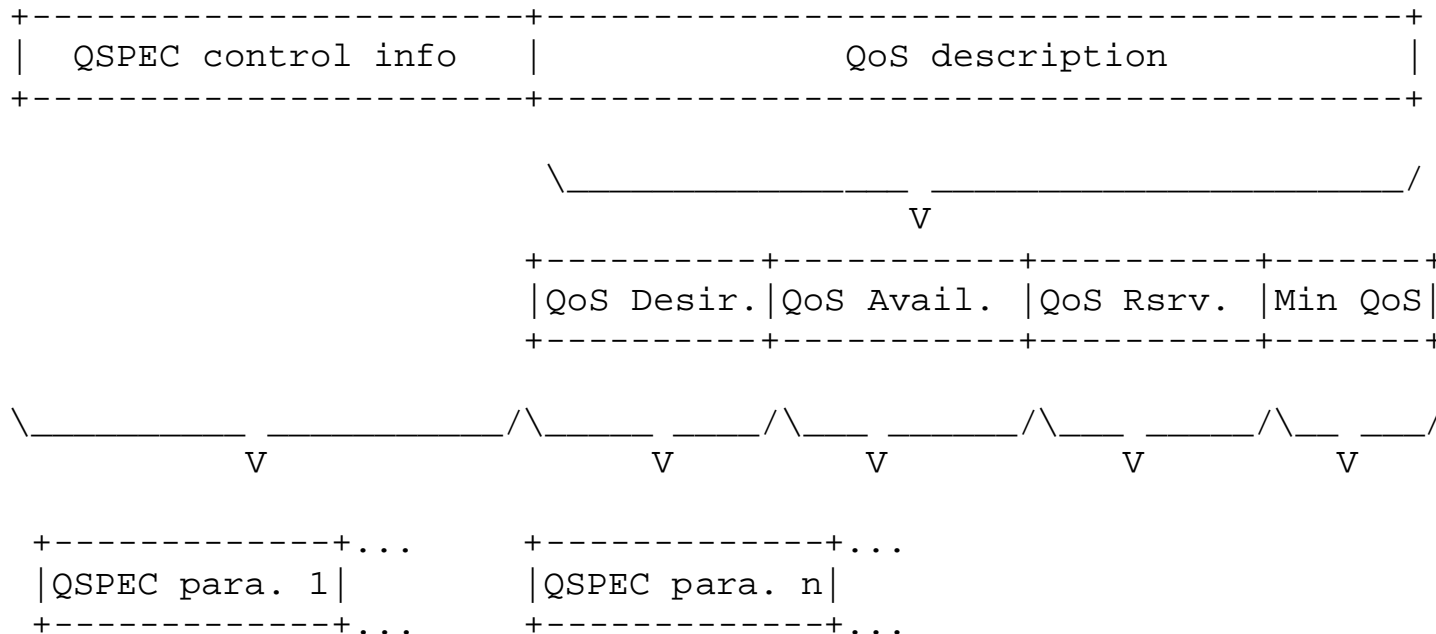


QoS NSLP Node Architecture

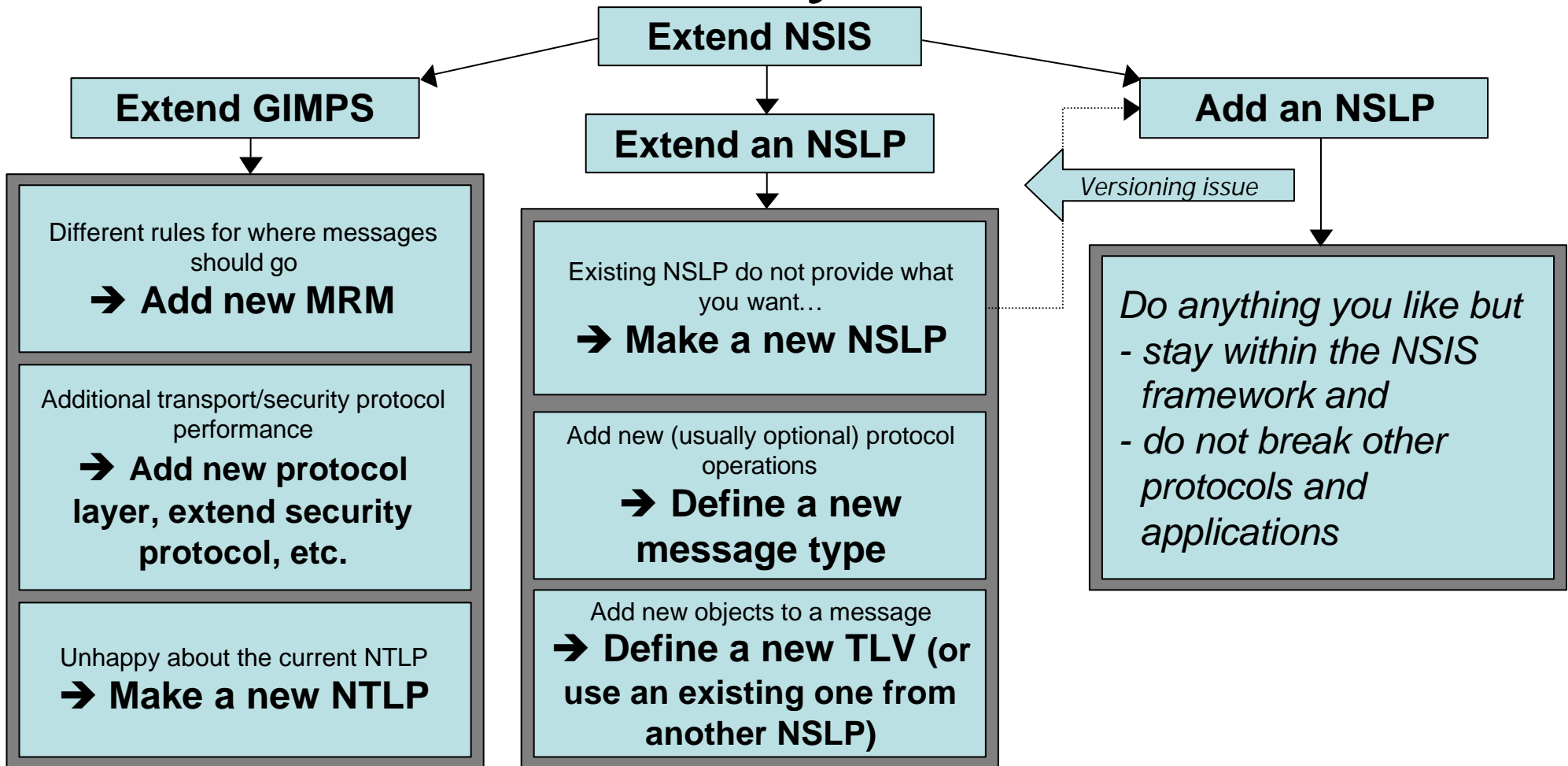


Structure of the QSPEC

- QSPEC parameters include
 - QoS description
 - describes actual QoS in objects
QoS Desired, QoS Available, QoS Reserved, & Minimum QoS
 - these objects are input/output parameters of Resource Mgmt. Fct.
 - e.g., bandwidth, token bucket
 - QSPEC control information
 - contains parameters that govern Resource Mgmt. Fct.
 - e.g., excess treatment
- Control Information and QoS Description objects are composed of QSPEC param.



Extensibility of NSIS



- The main extensibility has its origin in the extensibility of the IETF protocol itself.
- Providing the above-shown extensibility is ongoing work.

Backup Slides

QSPEC Parameters

- QSPEC Parameters
 - based on DiffServ & IntServ parameters
 - SHOULD be used if applicable to underlying QOSM
 - mandatory QSPEC parameters
 - MUST be understood by any QNE if populated
 - optional QSPEC parameters
 - SHOULD be understood by any QNE if populated & applicable to QOSM(s) supported by QNE
 - QNE MAY ignore if it does not support a QOSM needing the optional QSPEC parameter
 - all QSPEC parameters mandatory except
 - <Path Latency>, <Path Jitter>, <Path BER>, <Ctot>, <Dtot>, <Csum>, & <Dsum>
 - IntServ parameters <Ctot>, <Dtot>, <Csum>, <Dsum> rarely used
 - parameters can be read-only or read-write

QSPEC Parameters

- QSPEC = <QSPEC Control Information> <QoS Description>
- <QSPEC Control Information> = <NON NSLP Hop> <NSLP Hops> <Max NSLP Hops> <Excess Treatment>
- <QoS Description> = <QoS Desired > <QoS Available> <QoS Reserved> <Minimum QoS>
 - supports both sender & receiver initiated signaling
 - provides functionality corresponding to RSVP IntServ objects (AdSpec, Tspec, RSpec)