Towards the Future Internet
A Survey of Challenges and Solutions in Research and Standardization

Features of IPv6
- Simple header for efficient processing
- Sufficient number of addresses -> better distribution for efficient routing
- Flow Label for easy flow identification -> Quality of Service
- Built-in security: IPsec is mandatory

Challenges for Upper Layers:
- Support for IPv6 and IPv4 (dual-stack) -> Migration Path
- Handling of multiple addresses -> Multi-Homing
- Handling of prefix changes -> Mobility

Deployment:
- Supported by all major operating systems
- Usable via tunneling over IPv4, some providers already provide it directly!

Key Assumption of Classical Internet Routing:
- Router memory is scarce and expensive => Floom routing... but recent hardware is powerful and memory inexpensive!

New Approach: Flow Routing!
- Per-flow state for routing
- May be used for QoS mechanisms

Our Idea for a Simple QoS Mechanism:
- Overload handling procedure:
  - Focus packet discard on "selected flows" 
  - Full quality for all other flows!
- Application: Delivery of multimedia content to broadband customers (e.g. DSL)

Features
- Scalable
- Real-Time
- Lightweight
- Session handling
- Server pool management and
- Scalable
- Extendable
- Simple

Key Features
- Lightweight
- Real-Time
- Scalable
- Extendable
- Simple

Under Standardization by the IETF
- Reference implementation developed by us!
- RFCs coming soon!

RSerPool Terminology
- Pool Element (PE): Server
- PE ID: Unique ID of PE
- Handle: Unique ID of pool
- Handle set of pools
- Registrar (PR): Pool management
- Pool User (PU): Client

RSerPool Protocols
- ASAP (Aggregate Server Access Protocol)
- ENRP (Endpoint Handlespace Redundancy Protocol)

Network Layer
- Reliable Server Pooling
- Key Features
  - Lightweight
  - Real-Time
  - Scalable
  - Extendable
  - Simple

- Under Standardization by the IETF
  - Reference implementation developed by us!
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Application Layer
- Services using Reliable Server Pooling
- Reliable Server Pooling
- Open Source Prototype Implementation RSPLIB
- Evaluation, Optimization and Improvement
- Contributions to Standardization
- Evaluation, Optimization and Improvement
- Various Contributions to Major IEEE Conferences
- Contribution of Results into IETF Standardization
- 4 Working Group Drafts
- 6 Individual Submissions