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ISSE 2008

Influence of Security Mechanisms on the Quality of Service of VoIP

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Agenda

- Introduction to VoIP Security
- Impact on VoIP Quality
- Influence of Security Mechanisms
- Summary

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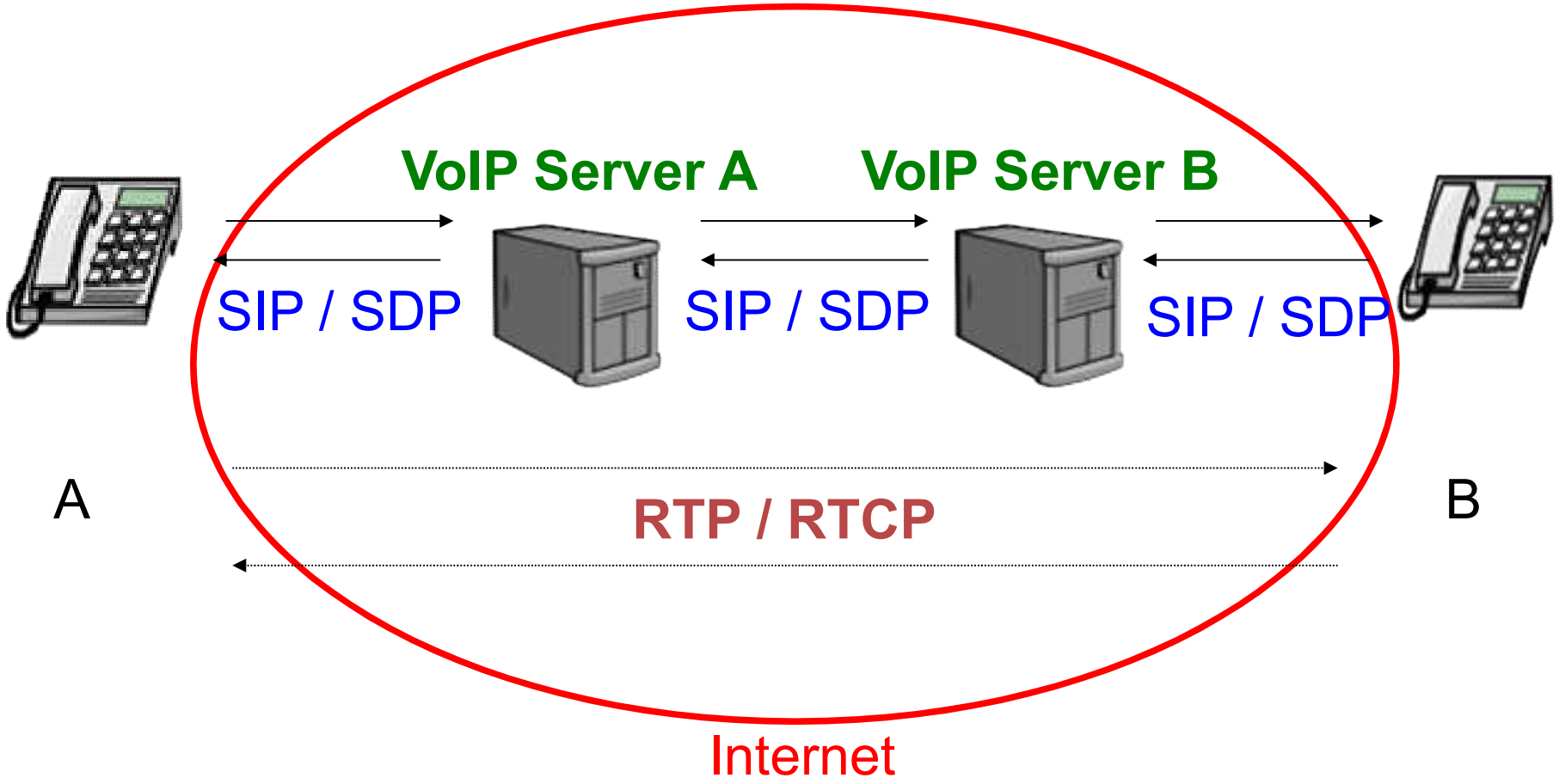
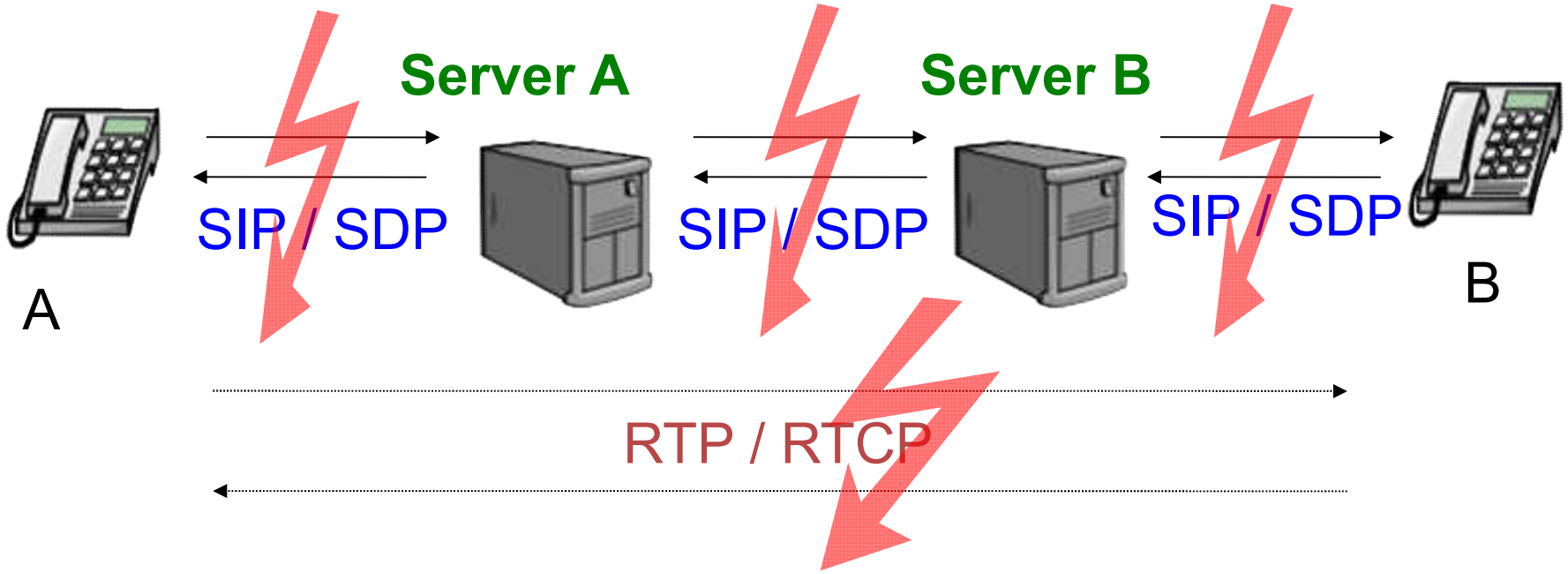
Introduction to VoIP Security (1/2)

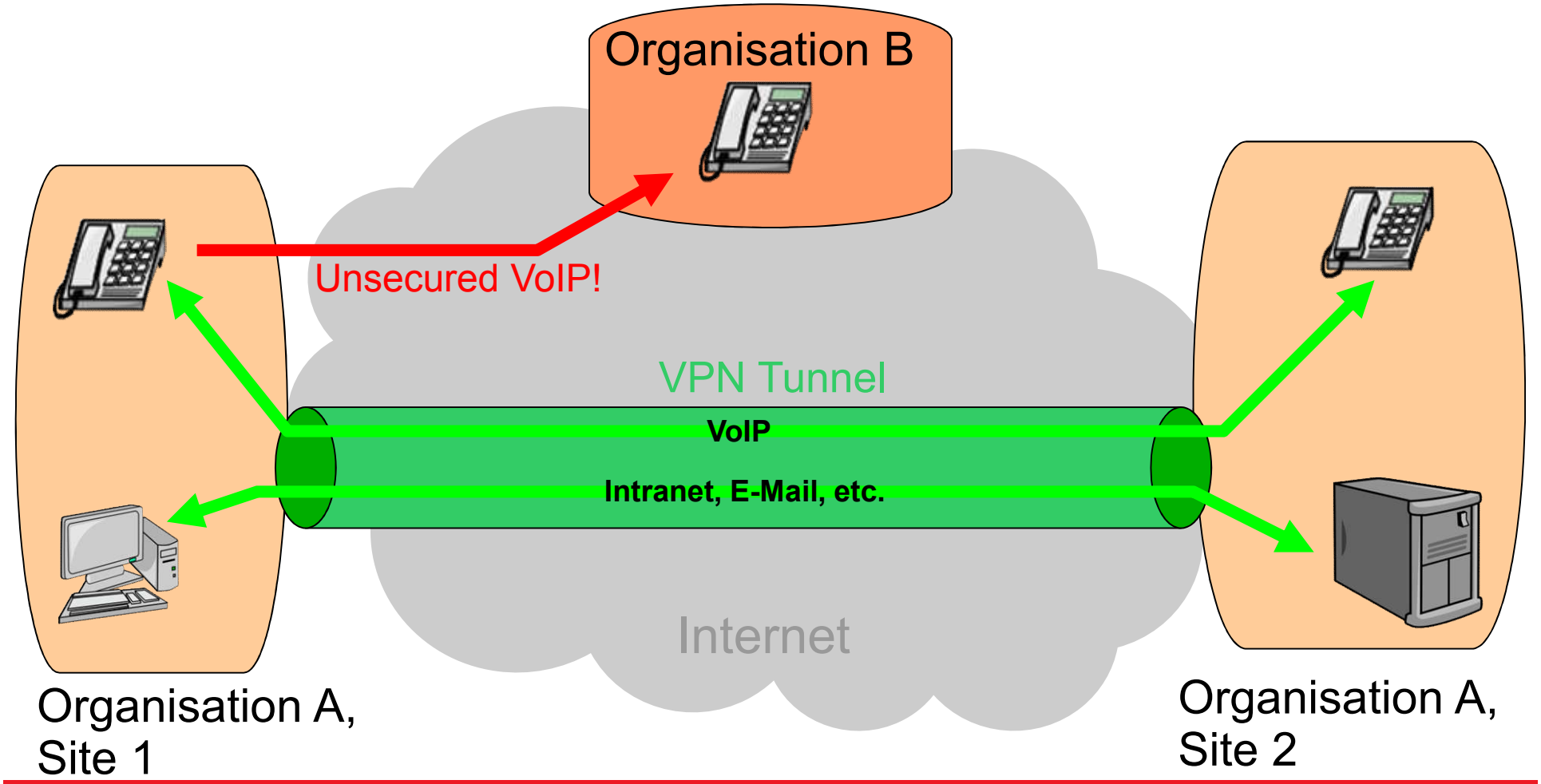


Introduction to VoIP Security (2/2)

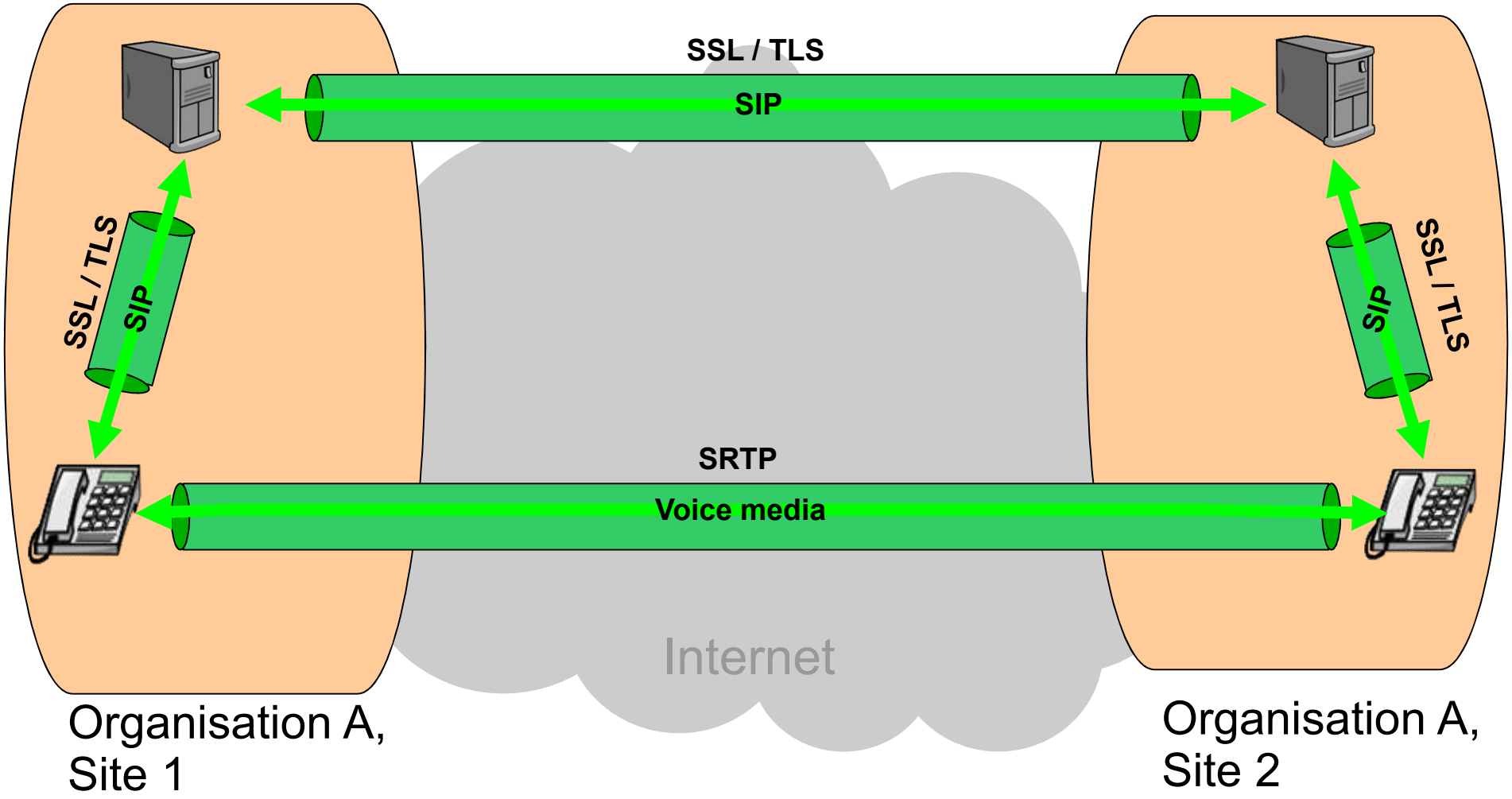
- **Need for security**
  - Confidentiality • Authentication • Integrity • Reliability • Availability



VPN-based Security



VoIP‘s own Security Mechanisms



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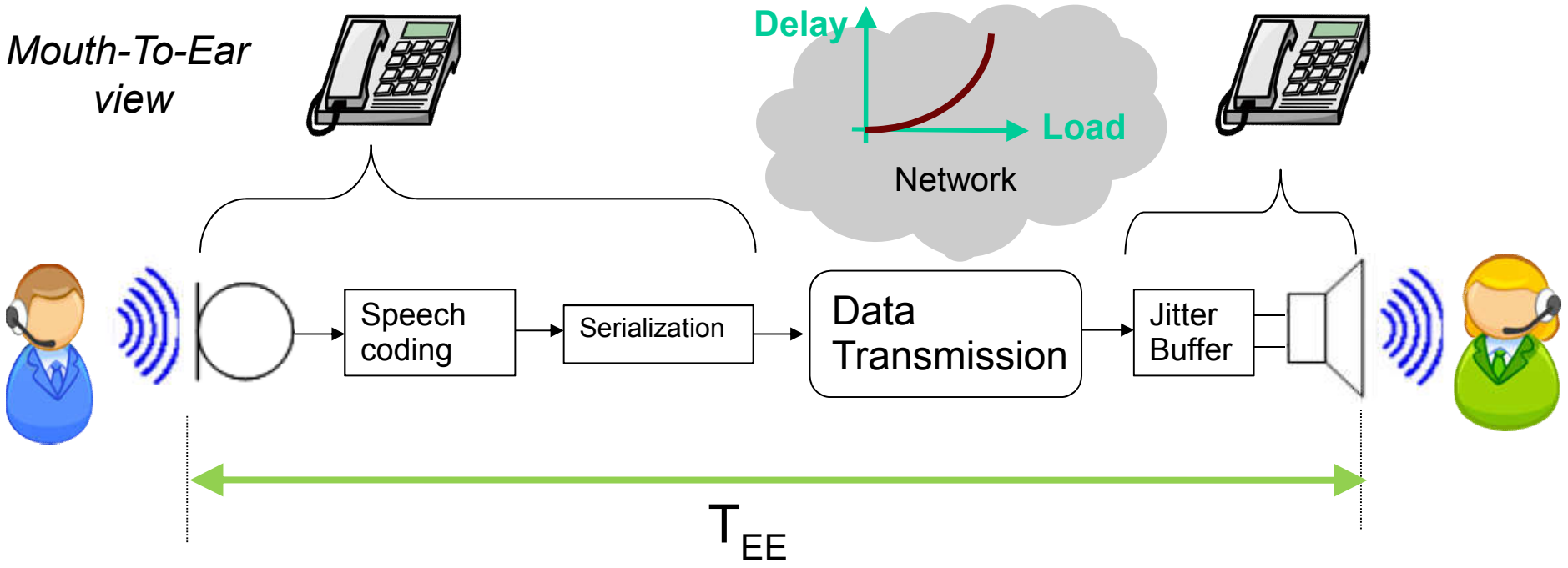
Introduction in Quality of Service

The term Quality of Service (QoS) is defined as a certain guarantee of network service requirements.

Requirements for VoIP:

- **Delay:** < 150 ms
- **Jitter:** Reasonably low
- **Packet loss:** Reasonably low
- **Bandwidth:** Sufficient

Impact on QoS of VoIP



Codec G.711:

-Speech coding: < 30 ms

-Serialization: **160+54 Byte / 10 Mbit/s < 1 ms → (128 Kbit/s ~ 13,4 ms)**

-Data Transmission: **48 ms (~12 Router - depended on the load)**

-Jitter Buffer: < 30 ms

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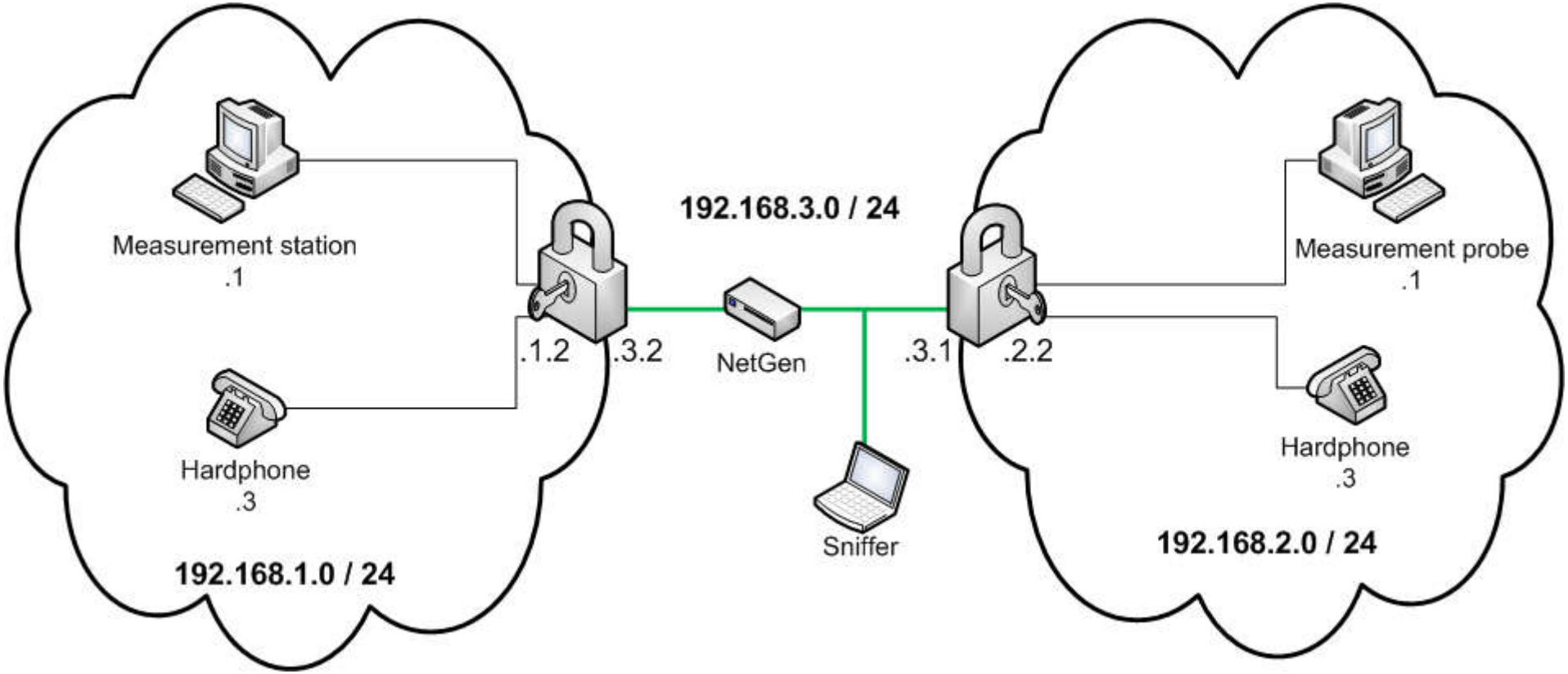
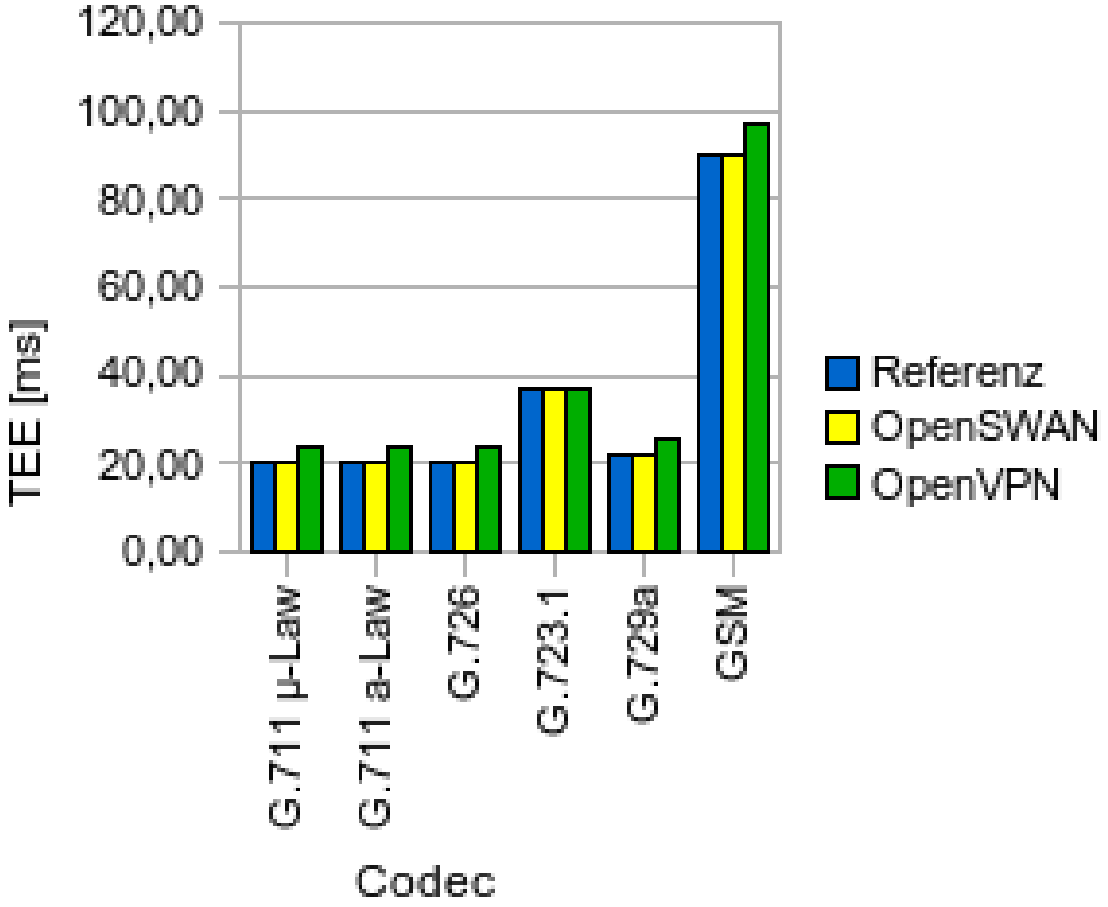
Impact of VPN-based security: Test network



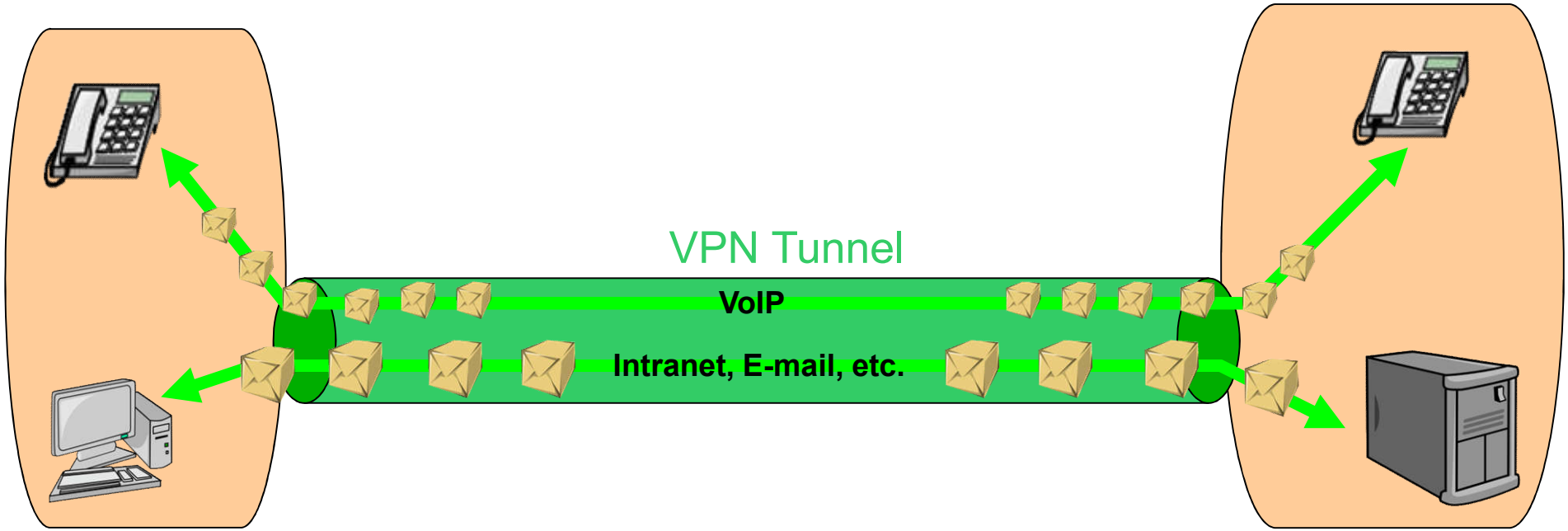
Impact of VPN-based security: Results

- Negligible increase in Delay
- No impact on Jitter and Packet Loss

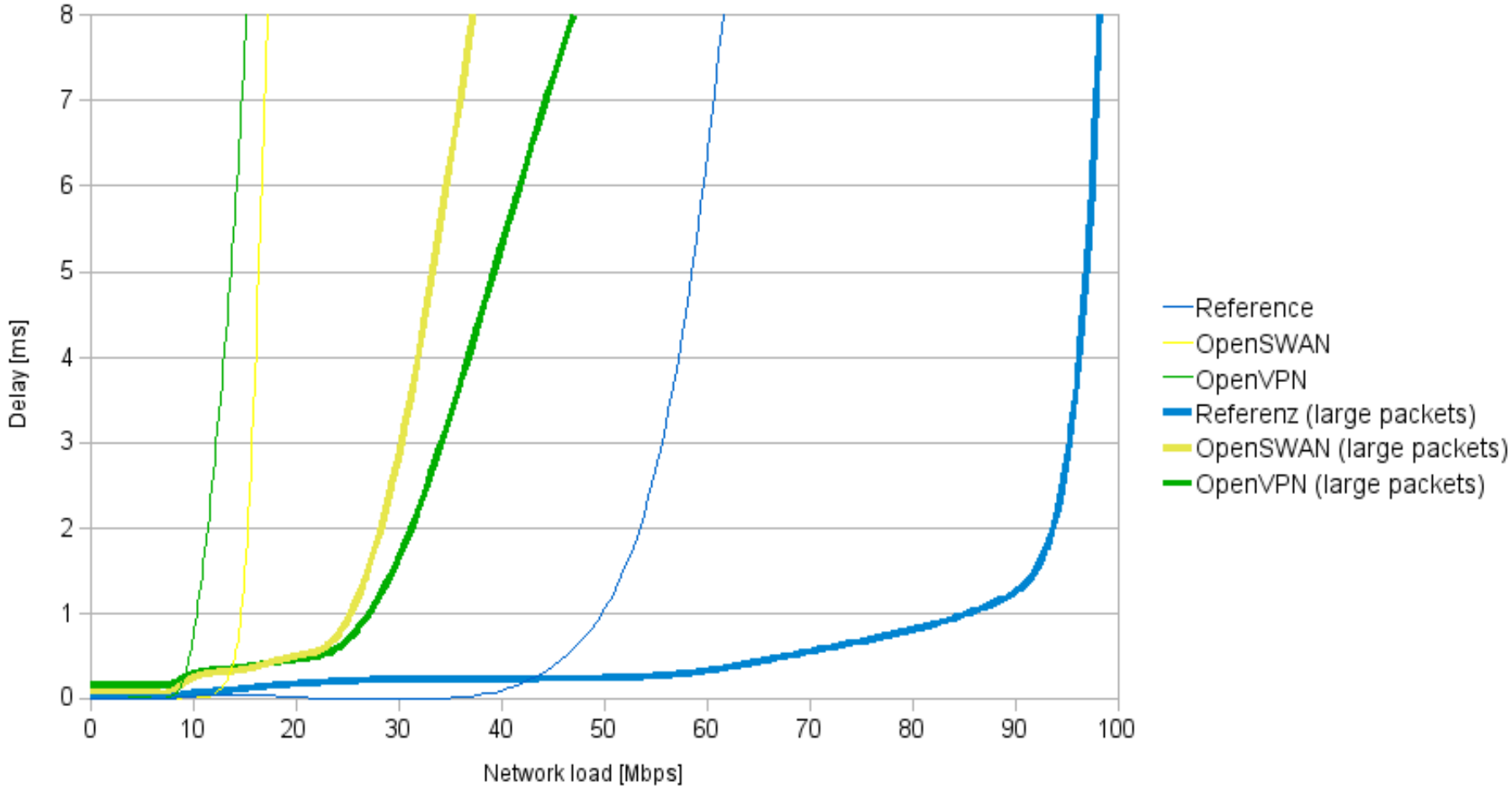


VPN Gateway Load

- Throughput capability depends on
  - Security mechanism
  - Gateway hardware
  - Network packet size



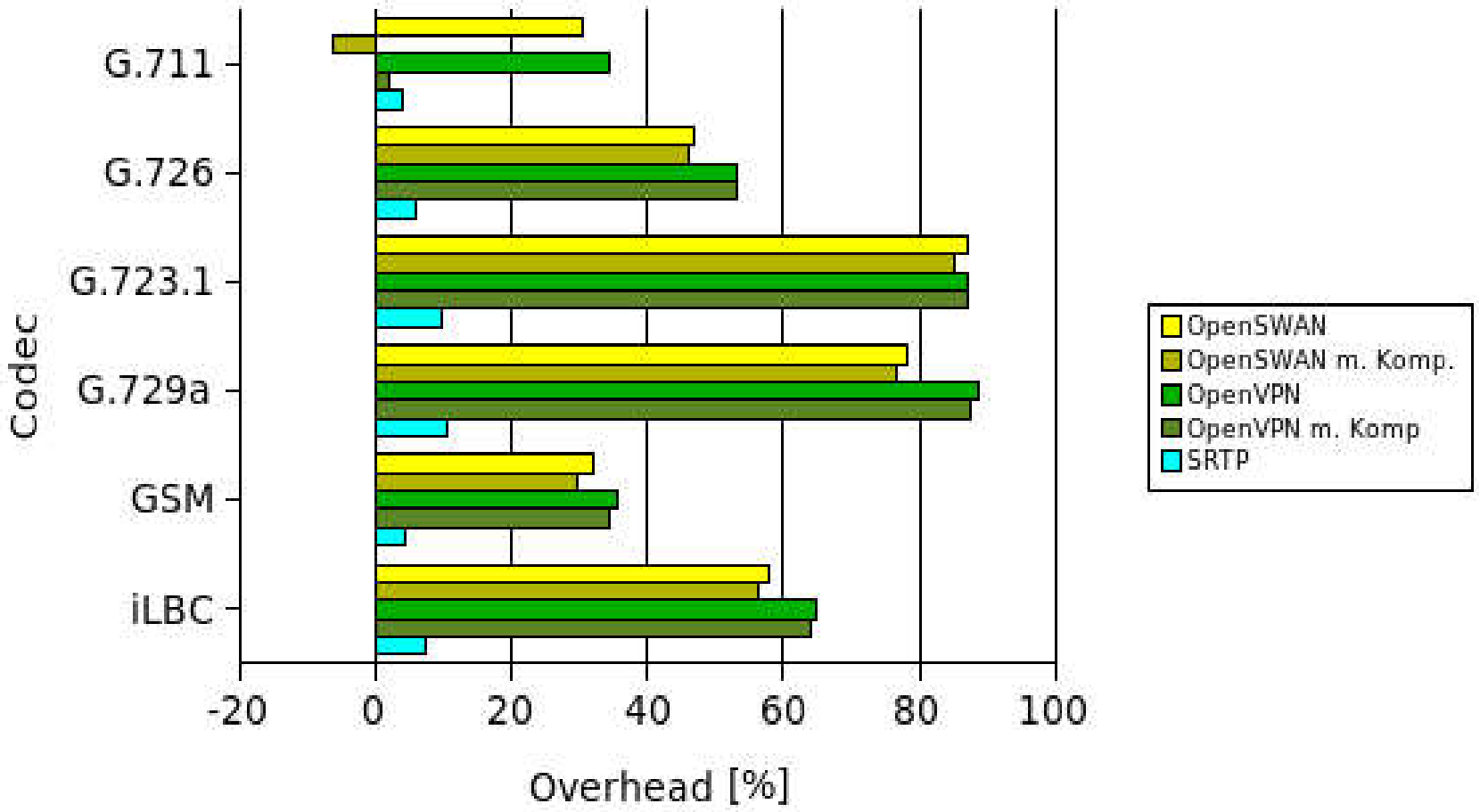
VPN Gateway Throughput Capability



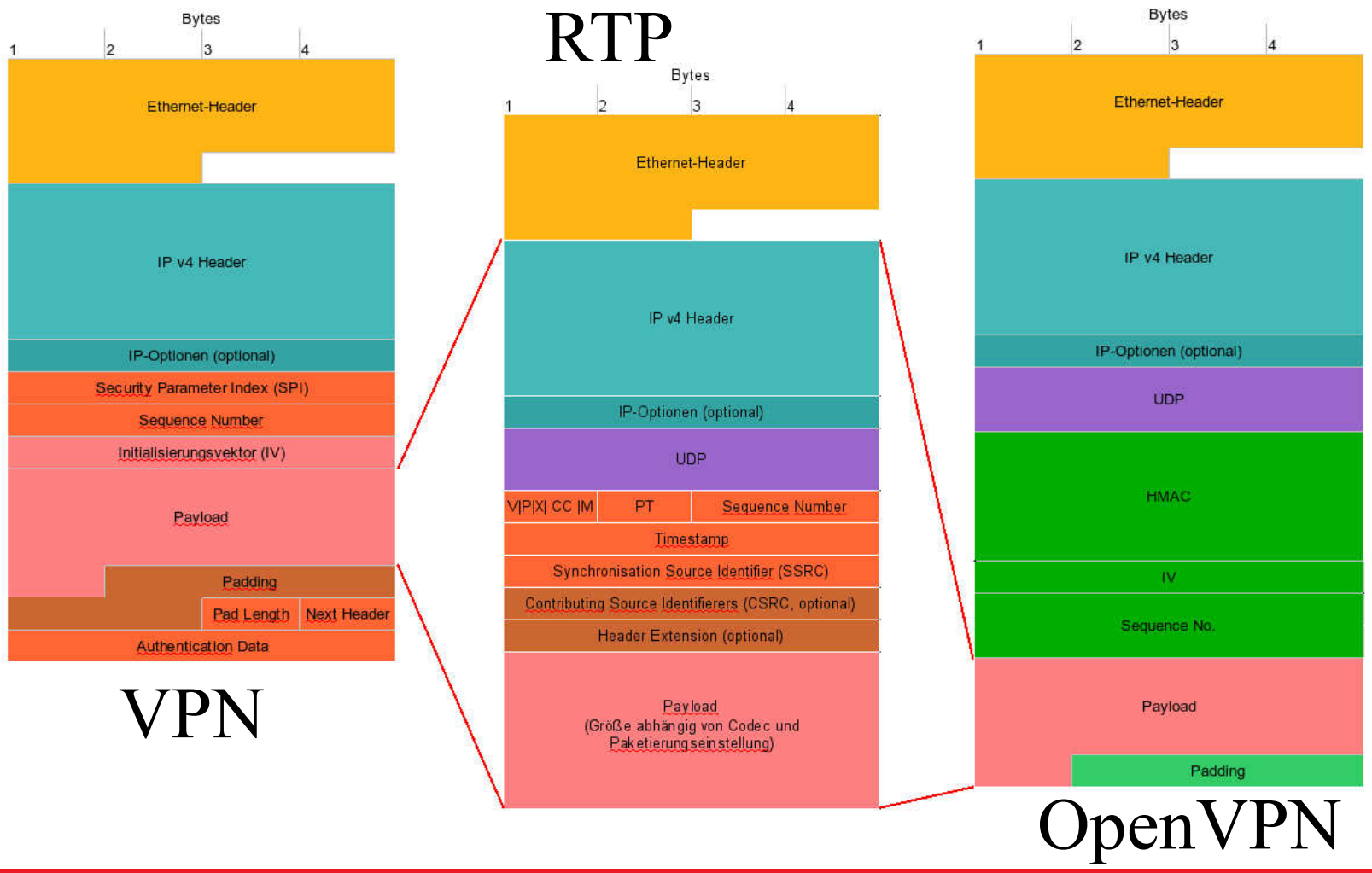
VoIP-specific Security Mechanisms

- SRTP
  - Reasonable conclusion
    - No impact on QoS parameters
      - Delay
      - Jitter
      - Packet Loss

Impact on Bandwidth

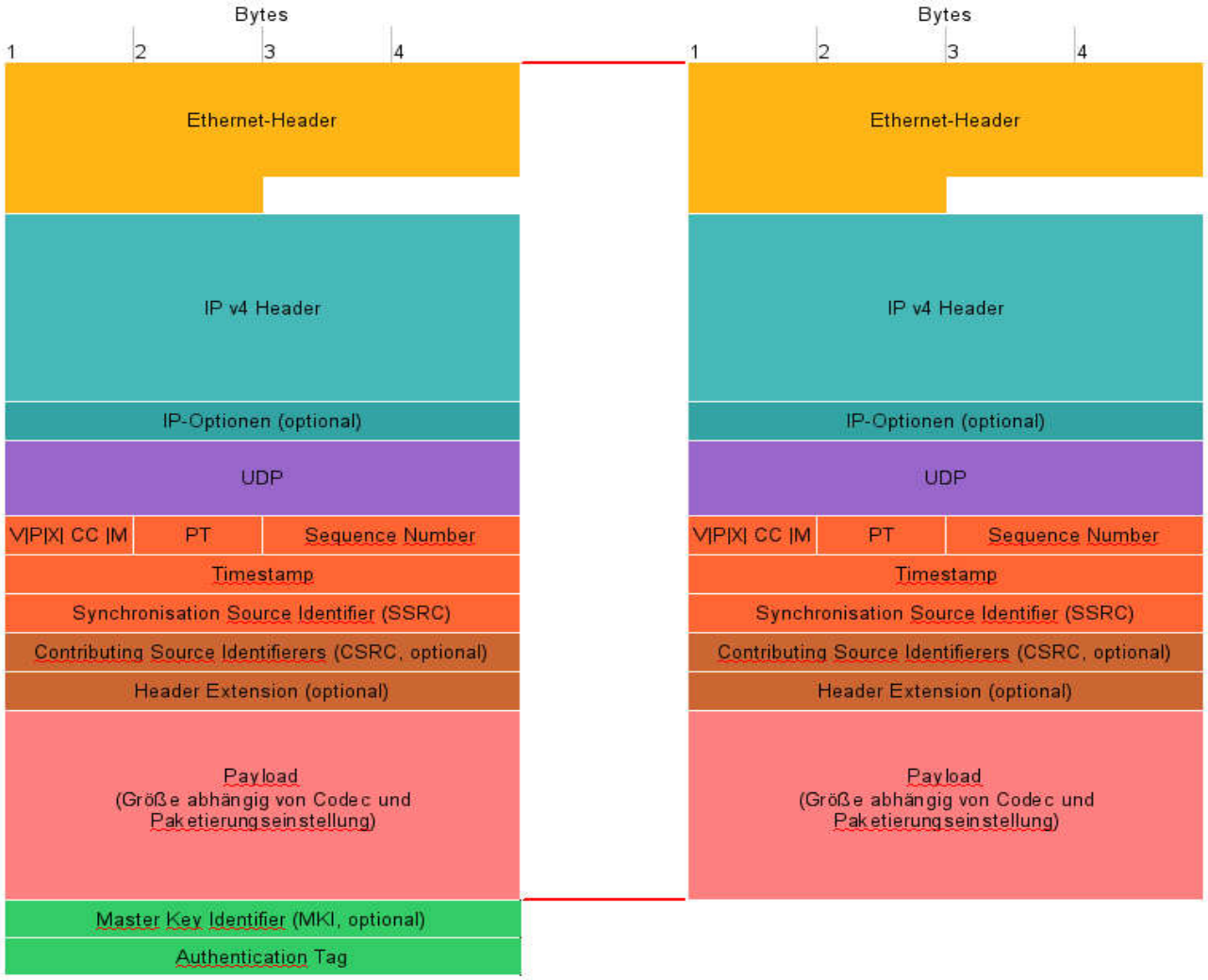


Overhead with VPN



Overhead with SRTP

SRTP



RTP

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Comparison

VPN-based security	VoIP-specific security
- PKI required	- PKI required (not ZRTP)
- Security via WAN, not LAN	+ End-to-end security
+ Transparent security mechanism	- Requires its own security infrastructure
+ Usually exists already	- Needs to be introduced with VoIP
- Significant increase of network overhead	+ Small increase of network overhead
- Heavy stress on VPN gateways (large installations)	+ Additional system load is distributed across the clients
+ Cost-efficient terminals	- Viewer terminals supporting SRTP

Summary

- Security mechanisms have **no significant** impact on
  - Delay
  - Jitter
  - Packet Loss
- as opposed to
  - Overhead
  - Gateway load

* The bandwidth capacity must be sufficient

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Thank you for your attention!

Any questions?

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