# Master Thesis

# Supporting IPv6 host-based multihoming (shim6) in Linux Firewalls

Christoph Paasch

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1 Theoretic overview

2 Shim6 and Firewalls: Problem statement

3 Implementation

4 Performance evaluation

5 Configuring a shim6-firewall

6 Conclusion

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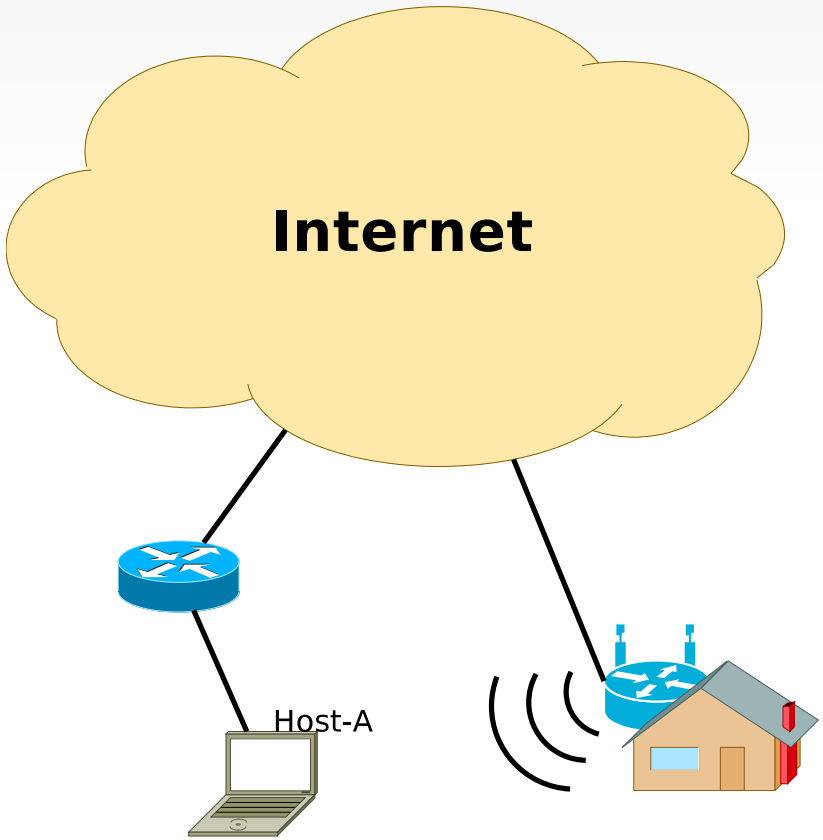
# Multihoming

Supporting **IPv6 host-based multihoming** (shim6) in Linux Firewalls



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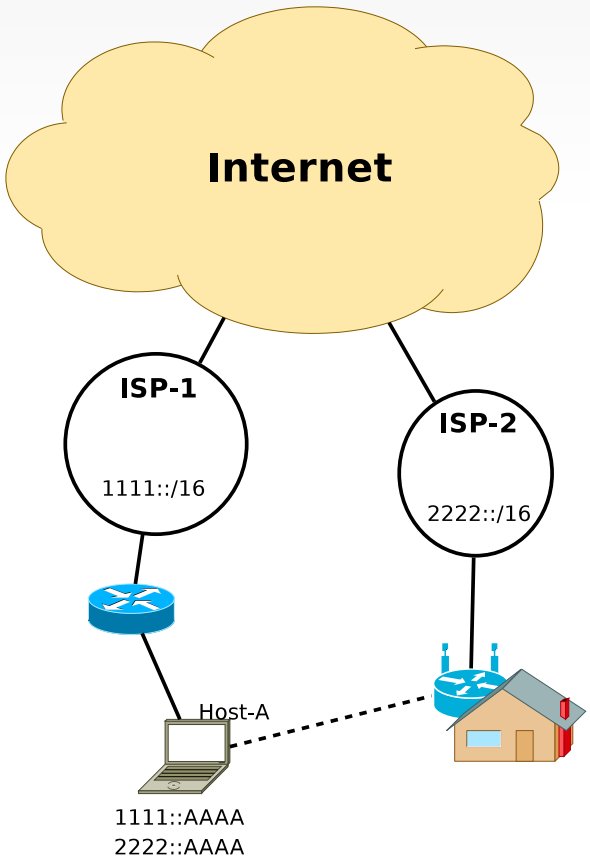

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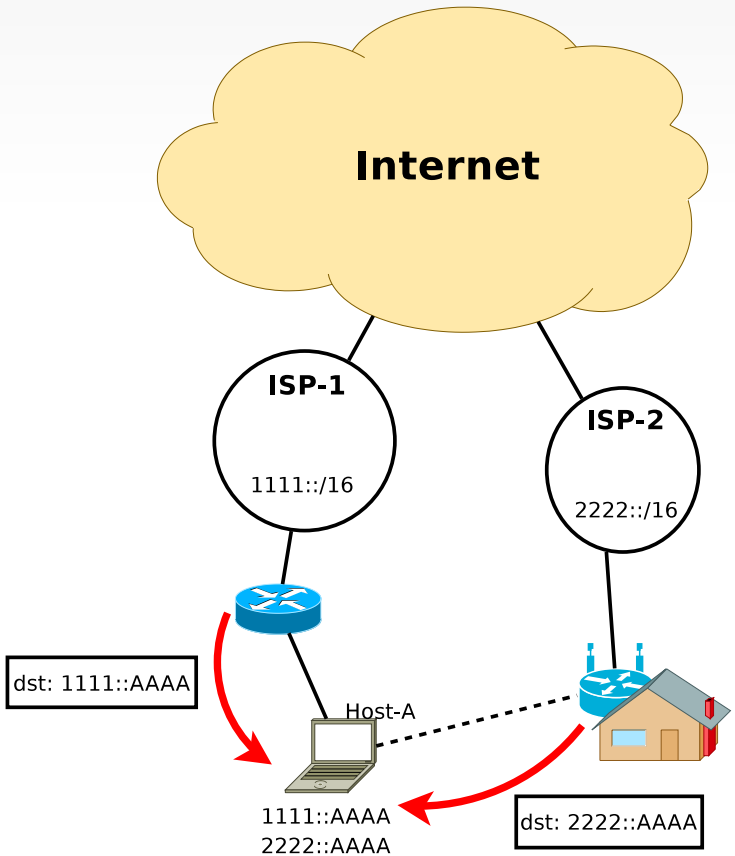

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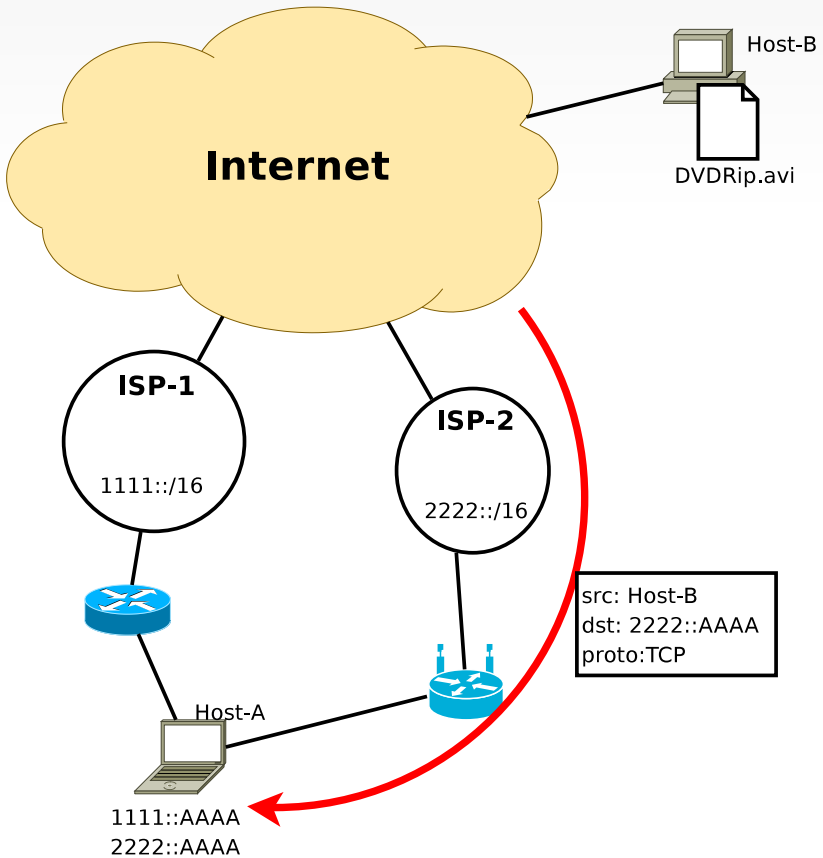

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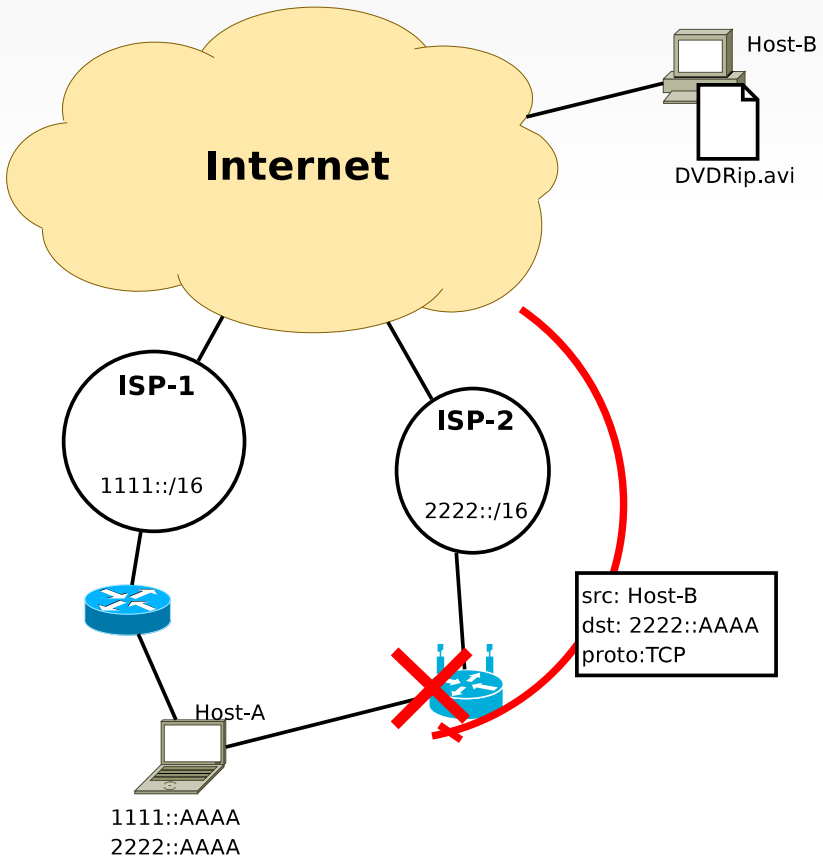

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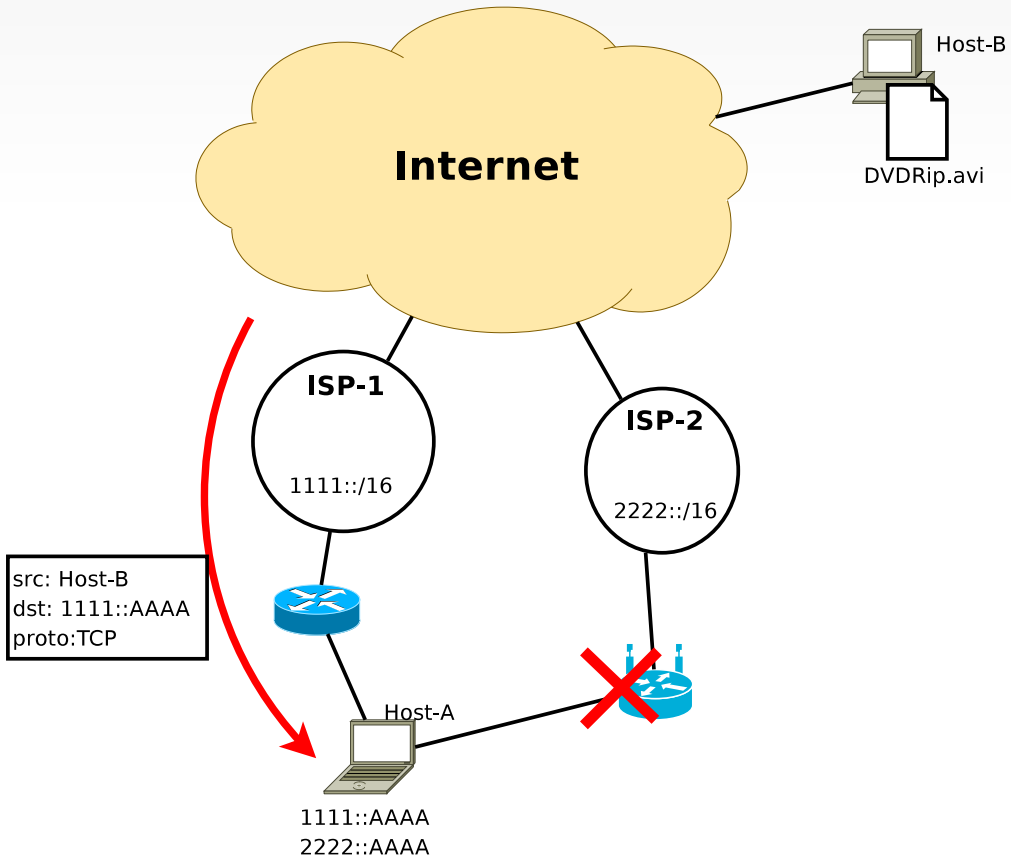

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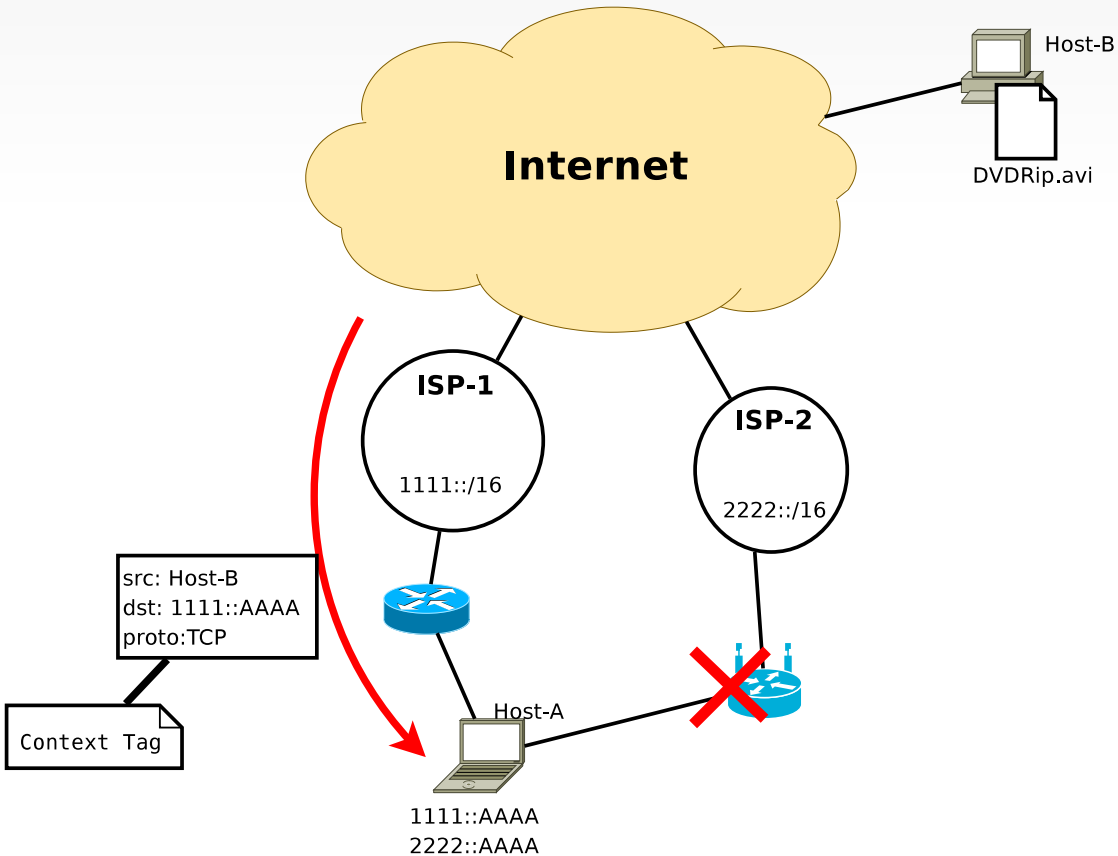
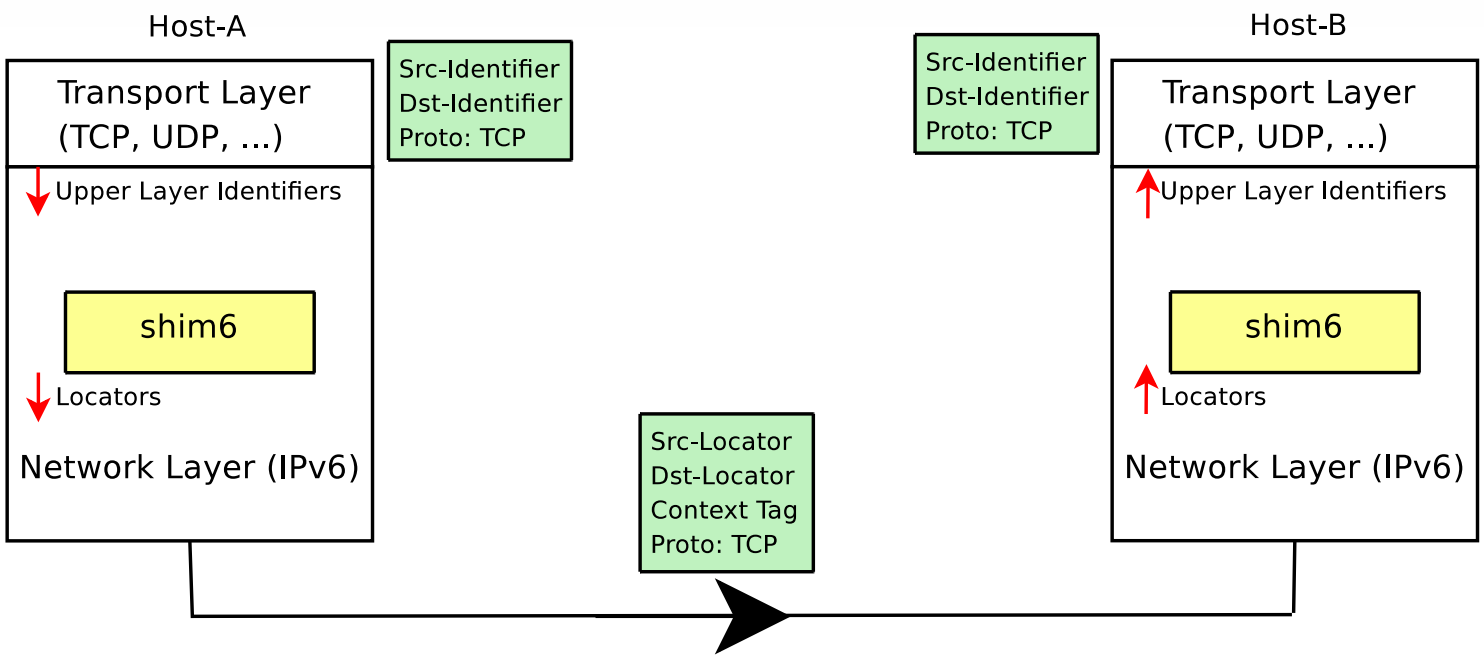


# Shim6

Separate Locators from Identifiers.

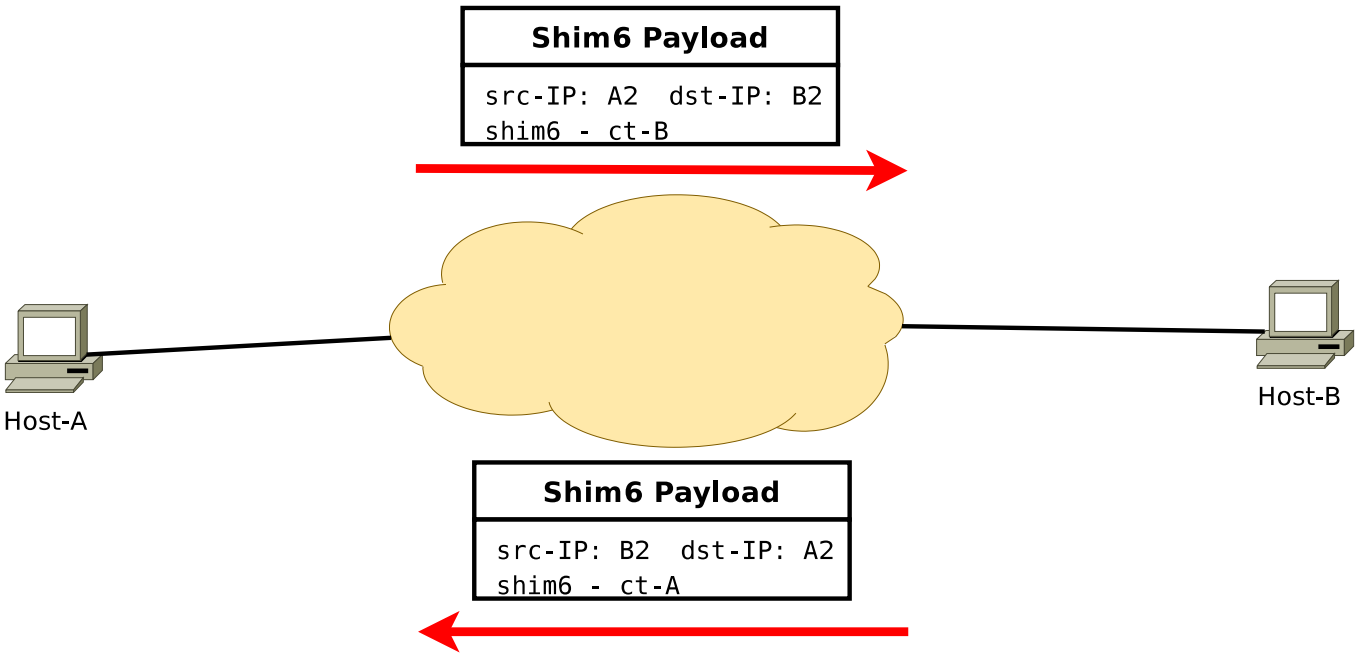
**Identifier** Identifies a connection and is passed to the upper layer protocols.

**Locators** Used inside the packet.



# Shim6

- Shim6 control messages
  - Establish the shim6 session
  - Assure connectivity
  - Switch locators
- Shim6 payload messages
  - Transport payload-data, tagged with the context tag



# Statefull firewall

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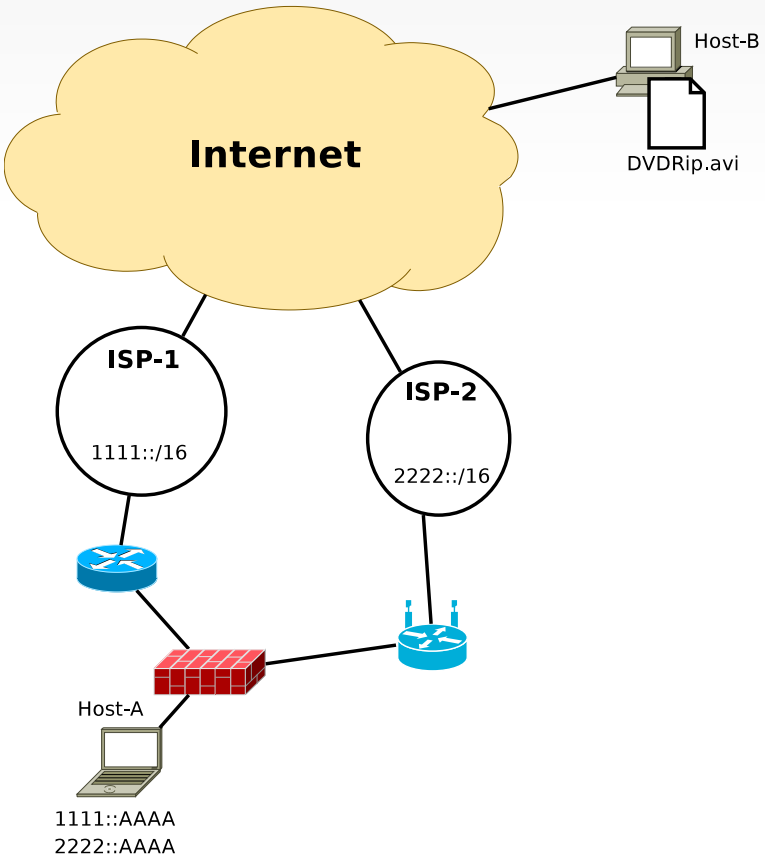

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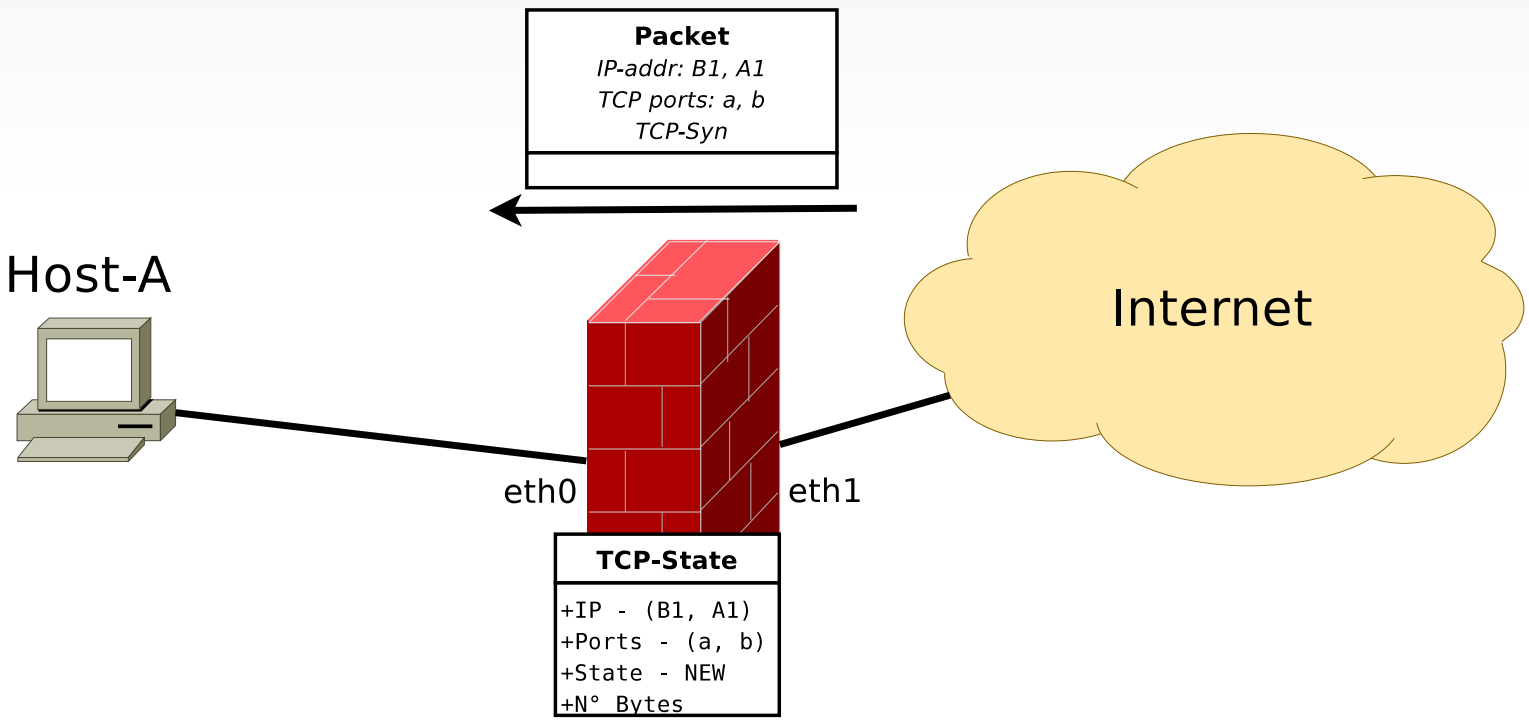

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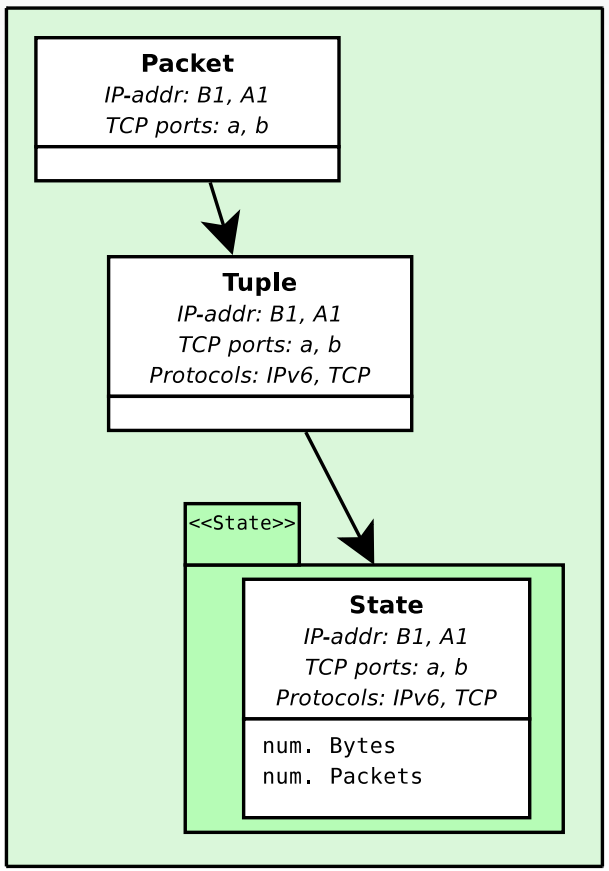

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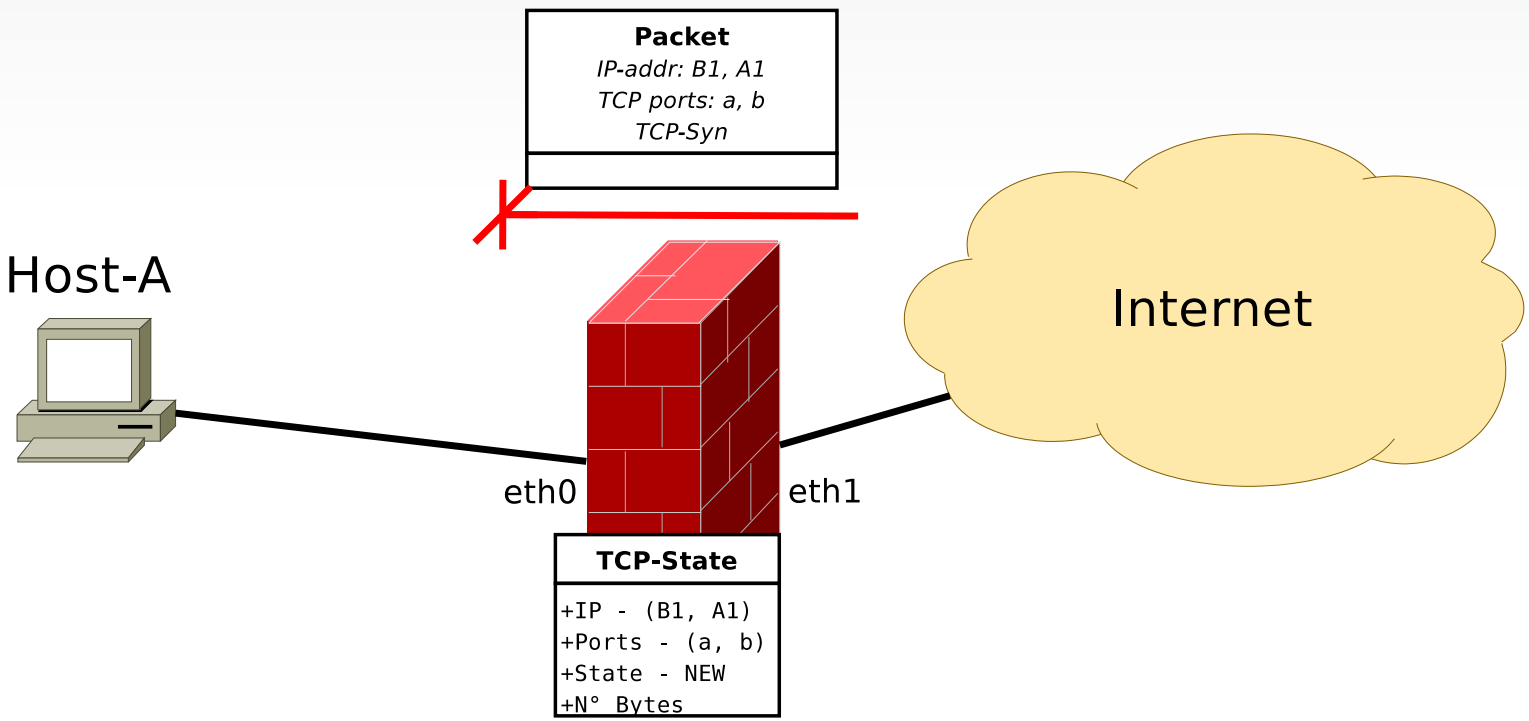


iptables -i eth1 --state NEW -j DROP

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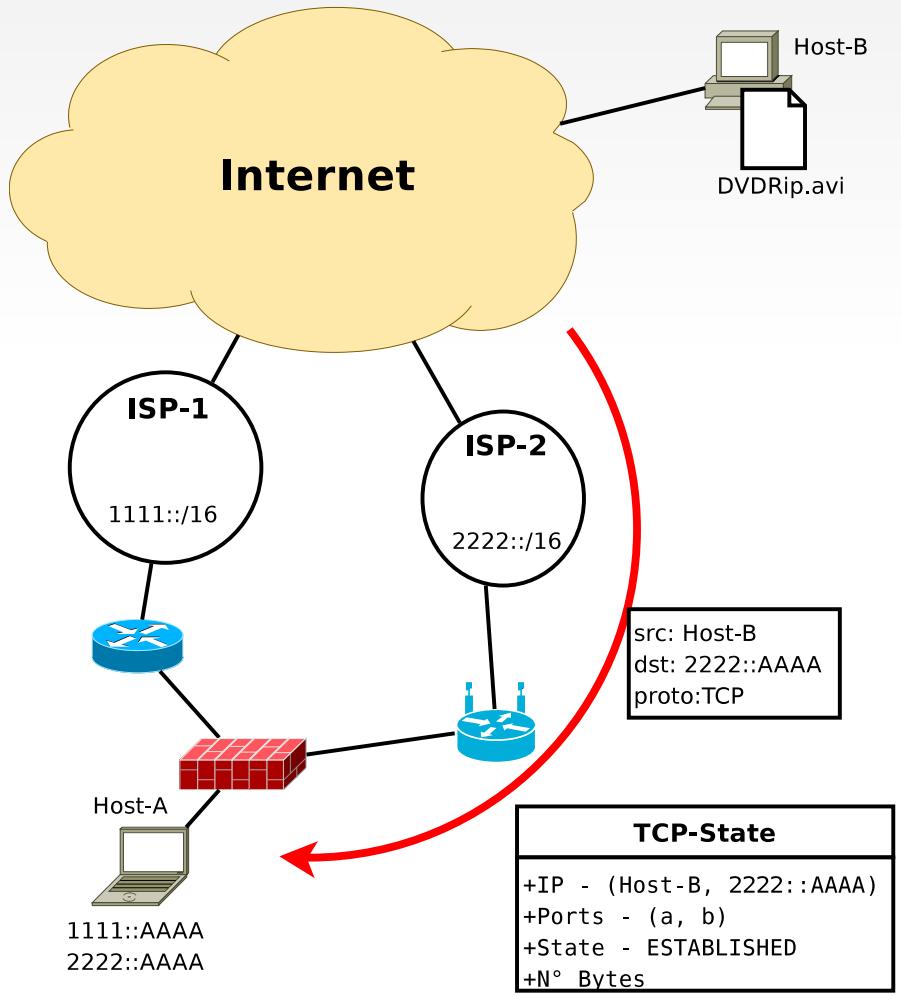
# Shim6 vs. Stateful Firewalls



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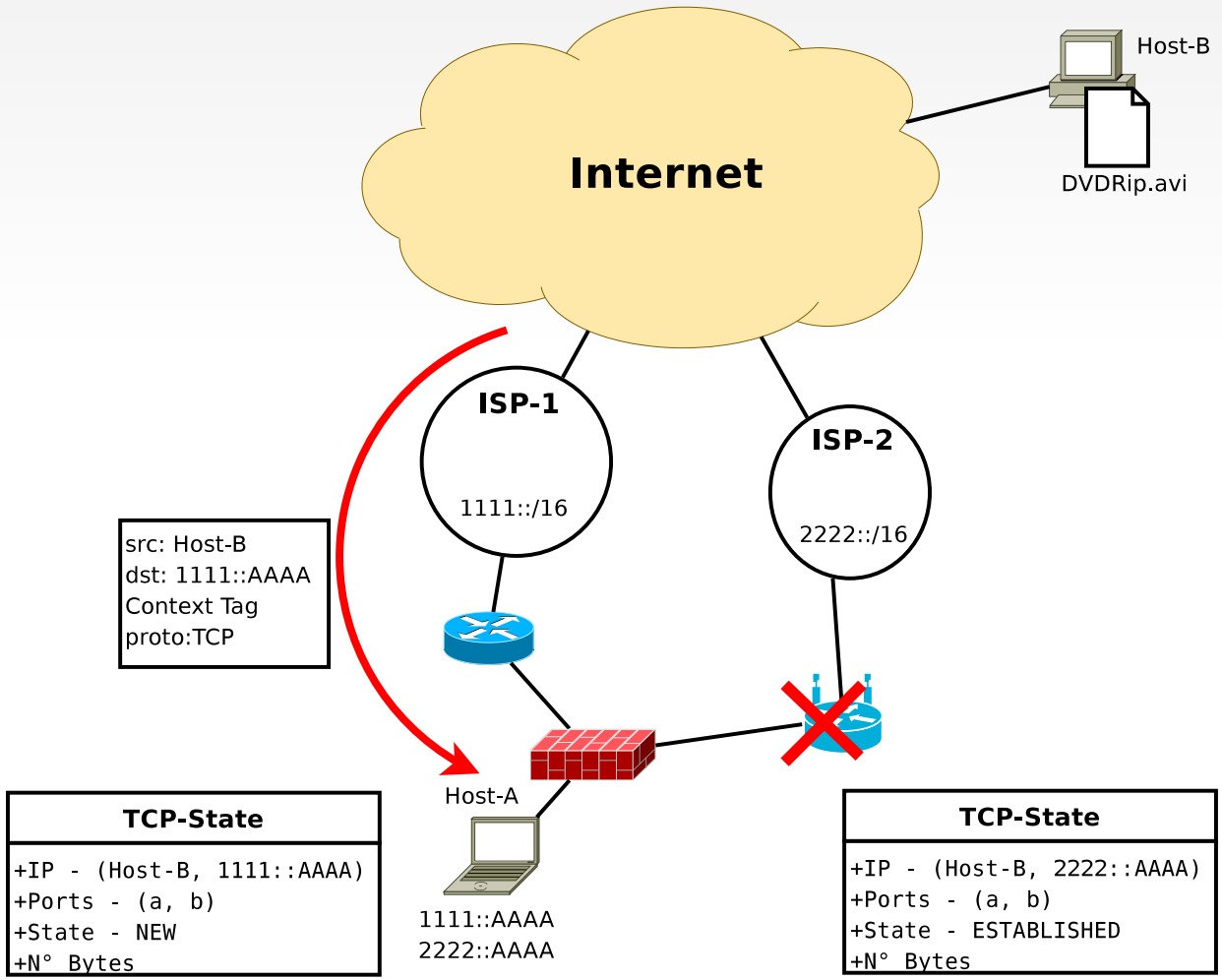

# Solution

- Associate the new flow to the original state
- Track shim6 context establishment
- Map Context Tag to the pair of identifiers

## Problems

Shim6 does not allow support of each feature in stateful firewalls.
Shim6 needs to be changed.

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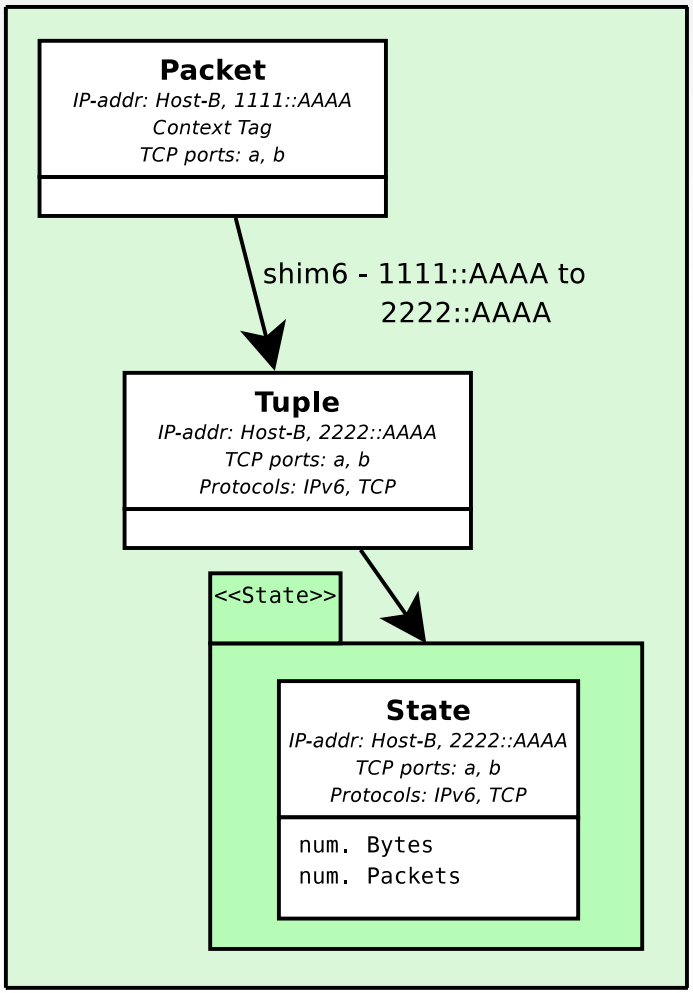
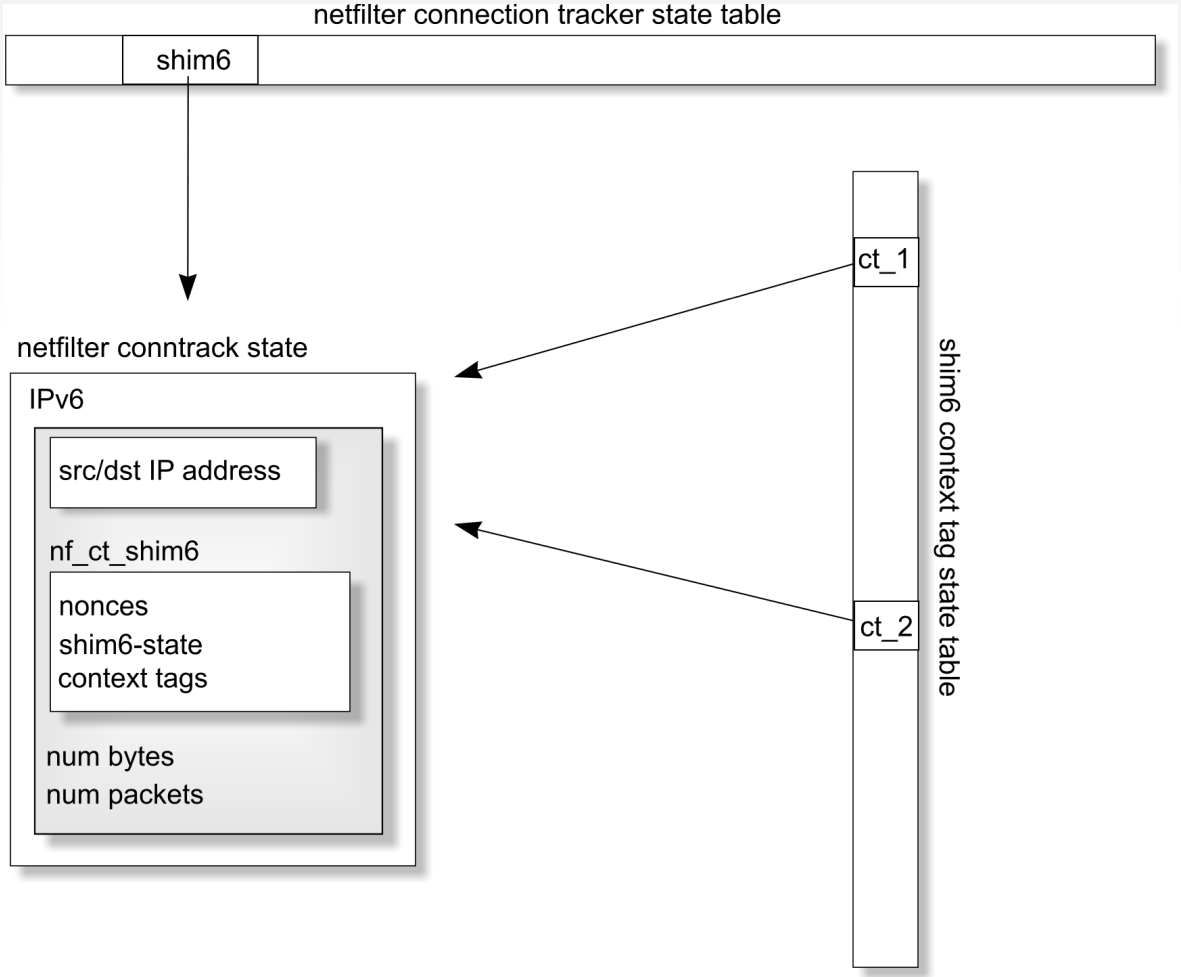


# Shim6-Firewall architecture



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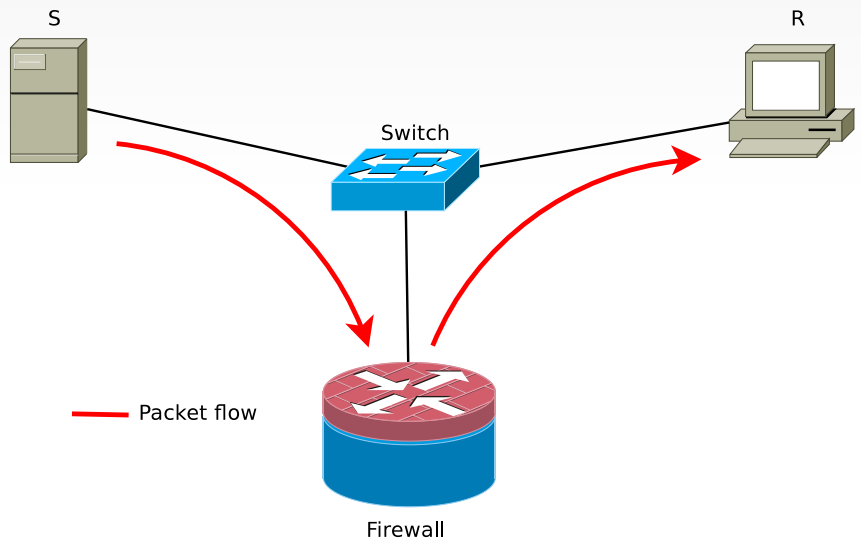
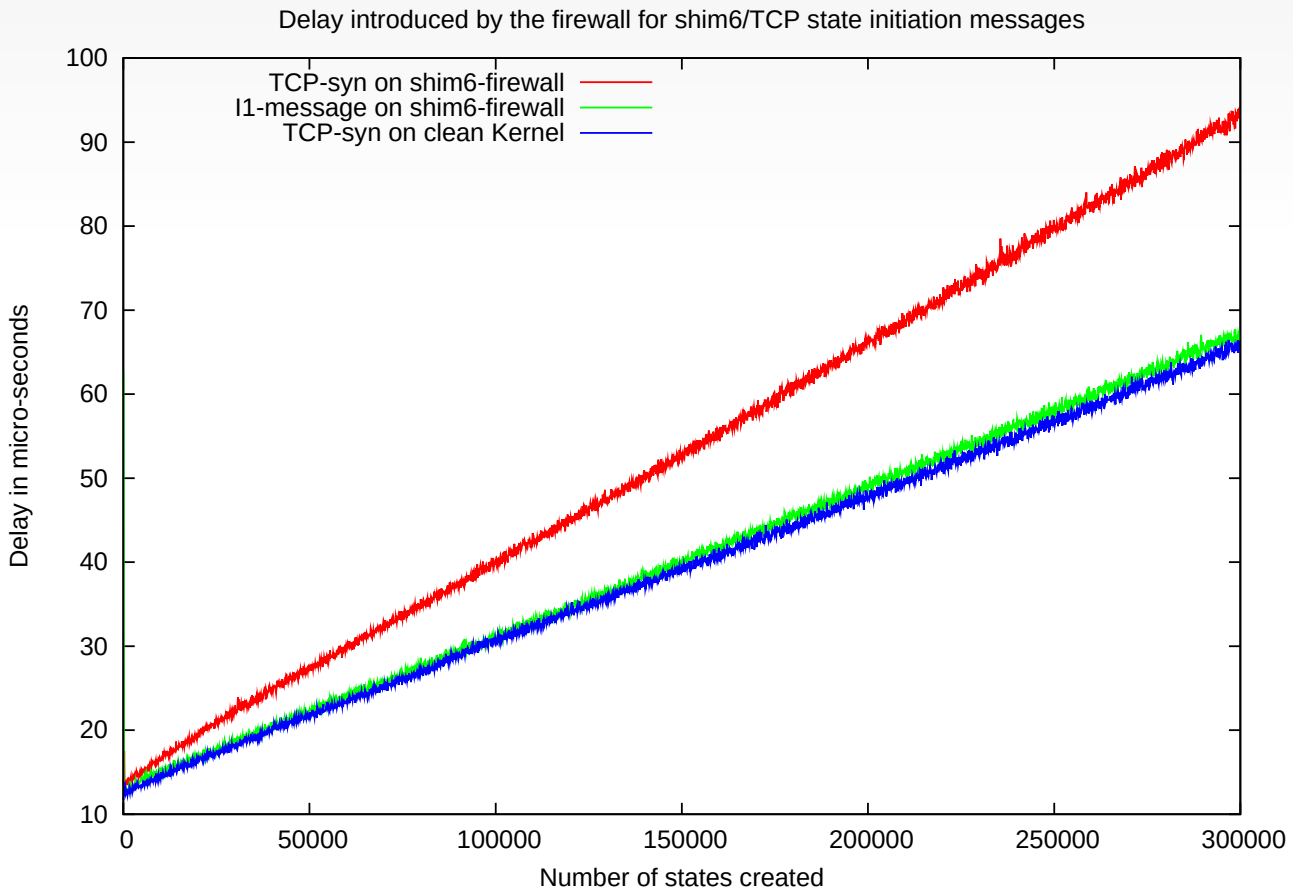
# Test Setup

- Creation of a huge number of firewall-states
- Delay measured that the firewall introduces



# Session Initiation messages



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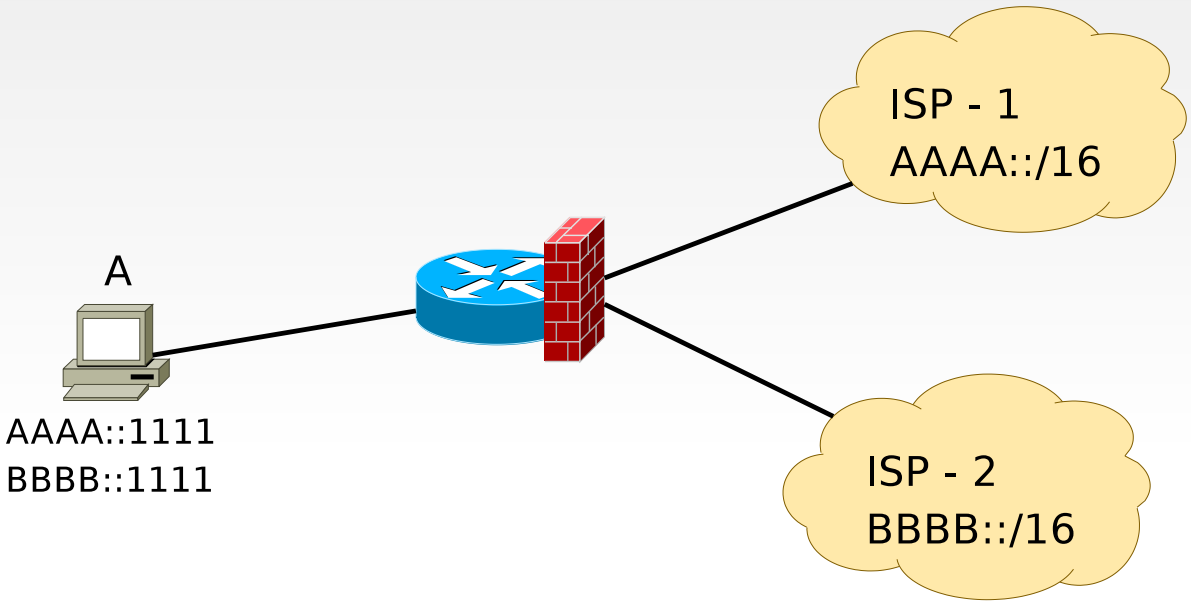


## Express consistent rules

- Filter on identifiers rather than on locators.
- Avoid locator-specific rules.
- Avoid per-locators rate-limiting rules.

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# Conclusion

- Most parts of shim6 are supported in the Linux firewall.
- Performs very well even with a huge number of states.
- Configuring the firewall needs to be done carfully.

## Future Work

- Minor modifications to the shim6 protocol.
- Adapt firewall to these changes.
- Tweak the firewall to achieve best performance.

# Questions?