Security Considerations for Tenant ID, Etc.

draft-eastlake-secdispatch-tenantid-consid-03

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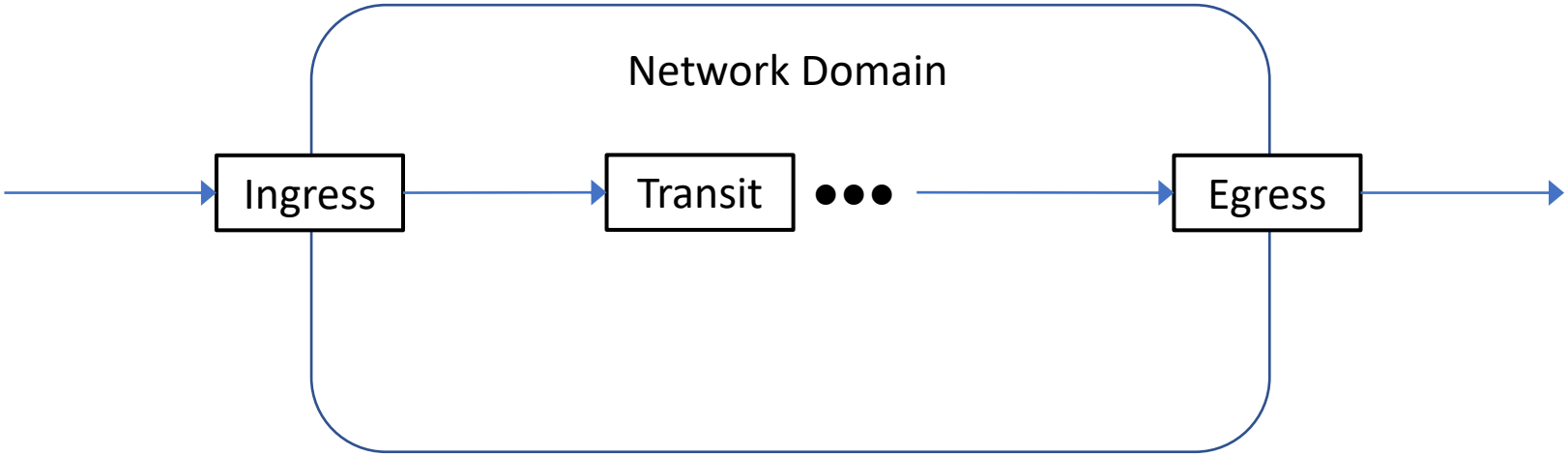
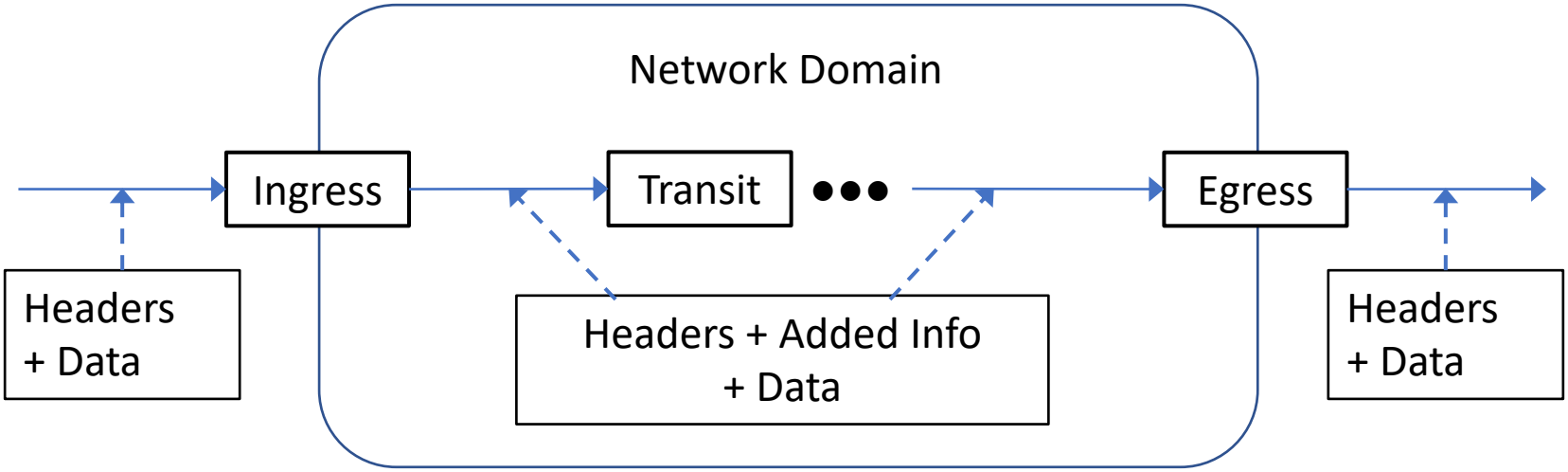
Scenario

- Inside a network domain, source / ingress information is included in a packet's header based on information available at ingress and is removed at the egress node(s). What are the Security Considerations?



Scenario

- Inside a network domain, source / ingress information (meta data) is included in a packet's header based on information available at ingress and is removed at the egress node(s). What are the Security Considerations?



Scenario

- Added Information might be based on:
  - Information only available at ingress node such as
    - Input port ID
    - VLAN Tag
  - Information that would be forwarded anyway but would not be easily accessible due to
    - Encryption
    - Depth in packet

Threats

- These are the primary threats due to the addition of such information to packets:
  - Privacy due to surveillance of added information
    - Link Surveillance
    - Surveillance from within transit/egress nodes
  - Modification/Forgery
    - On a link
    - Within a transit/egress node
- Other threats like packet deletion or replay need to be considered but are only weakly related to the addition of information.

Example

- For example, if VXLAN [RFC7348] is in use, the combination of
  - the outer IP header source and destination IP addresses, which identify VXLAN Tunnel End Points (VTEPs), and
  - the inner original header IP addresses,
- normally enable one to precisely identify a host/VM/Tenant.

Security Considerations

- Surveillance Oriented Considerations
  - Minimization
  - Encryption
  - Obfuscation
- Other Security Considerations
  - Integrity and Authentication Considerations
  - Covert Channel Considerations

Security Considerations

Surveillance Oriented Considerations:

Minimization > Encryption > Obfuscation

- MUST minimize the inclusion of such added information with packets. Information that is not present does not cause security problems for the threats being considered.

Security Considerations

Encryption:

- With good algorithms and key management, this secures plaintext so it cannot be recovered without the key.
- If additional information is needed in packets, consider:
  - Hop-by-hop link encryption and
  - Edge-to-edge encryption.
    - Fields needed to route the packet and control packet handling need to be readable.
  - If some information cannot be encrypted, consider securing it with AEAD.
  - Some information, like number and size of packets, is hard to efficiently conceal.

Security Considerations

Obfuscation, if encryption impractical:

- Weak type security to protect from
  - inadvertent disclosure (such as accidentally viewing a packet as ASCII while debugging a network) and
  - easily guessable valid identifiers (see [RFC9416]).
- Relatively easy, for example
  - XOR some nonzero fixed bytes with a field and
  - assign new identifier values in a non-sequential manner.

Security Considerations

- Other Security Considerations
  - Integrity and Authentication Considerations
    - Integrity and Authentication of additional information is important.
    - When encrypting, authenticated encryption / AEAD should normally be used.
  - Covert Channel Considerations
    - Additional fields or encrypted parts of a packet may provide places that can be used as covert channels to down stream nodes.

Example Fields

- Service Function Chaining (SFC) Network Service Header (NSH) Context Headers (see RFC 9263 in particular).
- VXLAN Network Identifier and NVGRE Virtual Subnet ID.
- Geneve Variable Length Options.
- Outer IP Fields in the case of tunneling.
- IPv6 options.

Next Steps

- Soliciting comments
  - draft-eastlake-secdispatch-tenantid-consid-03

- RTGWG adoption call?

END