

Bundle in Bundle Encapsulation (BIBE)

Draft Updates



Dr. Alberto Montilla, Spatiam Corporation
Scott Burleigh, Kiisel Burleigh Corporation
Joshua Deaton, Science Applications International Corporation

Motivation

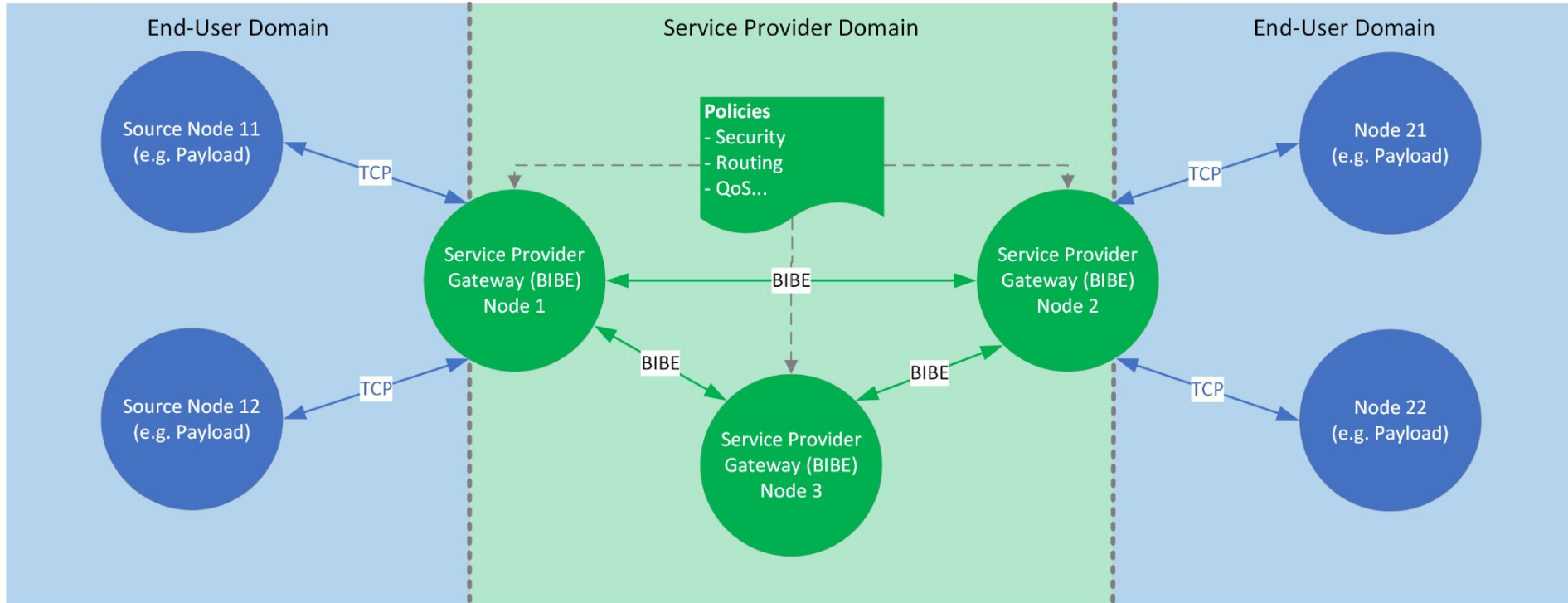
<https://datatracker.ietf.org/doc/html/draft-ietf-dtn-bibect-03> - expired August 2020.

We've resumed work on Bundle in Bundle Encapsulation IETF draft. A new proposed version is expected soon.

- Original motivation was extending security: BIBE enables defense against traffic analysis and provides a way to support interim security destinations.
- BIBE is key to Service Provider DTN networks. Upcoming Technology Demonstration in the ISS by Spatiam Corporation.
- Migration from BPv6 to BPv7 - CCSDS working on an Orange Book to describe NASA's DTNME implementation of BIBE for carrying over BPv6 over a BPv7 network.
- Requirements convergence for the initial three implementations available: ION, DTNME and μ D3TN.

BIBE in Service Provider networks

BIBE is critical to enforce policies within Service Provider domains



BIBE - ION implementation updates

- To accommodate security and Service Provider Network use cases, need to give BIBE source (encapsulating) nodes full control over the parameters that condition the forwarding of BIBE (encapsulating) bundles.
- So the bibe administration function is enhanced: the “bcla” configuration objects now assert such additional parameter values as status report requests, report-to endpoint ID, and flow label for the encapsulating (outer) bundles.
- RFC 9171 prohibits the issuance of status reports for bundles whose payloads are administrative records. BIBE bundles’ payloads are administrative records. We propose an additional bundle processing flag indicating “payload is BIBE” that introduces an exception to the rule in RFC 9171.

BIBE - CCSDS Orange Book - DTNME

DTNME's primary purpose for implementing BIBE is to support legacy BPv6 bundle traffic as we work to move towards deploying BPv7.

- DTNME 1.2.0_Beta (available on github), includes the capability to encapsulate bundles within other bundles. This mechanism is modeled after the draft-ietf-dtn-bibect-03 with a slight modification.
- We have followed the standard and developed BIBE as an intermediate convergence layer (CL) that sits between the BP layer and transport layer CL such as TCP.
Note: while encapsulating a BPv6 bundle within a BPv7 bundle using BIBE is allowable according to the existing standard the inverse is not. Then, a Pseudo BPv6 BIBE Administrative record has been created.

The detailed information is in the BIBE Orange Book that is being developed for CCSDS, which is expected to be available in Q2'2024