# BPSEC Updates

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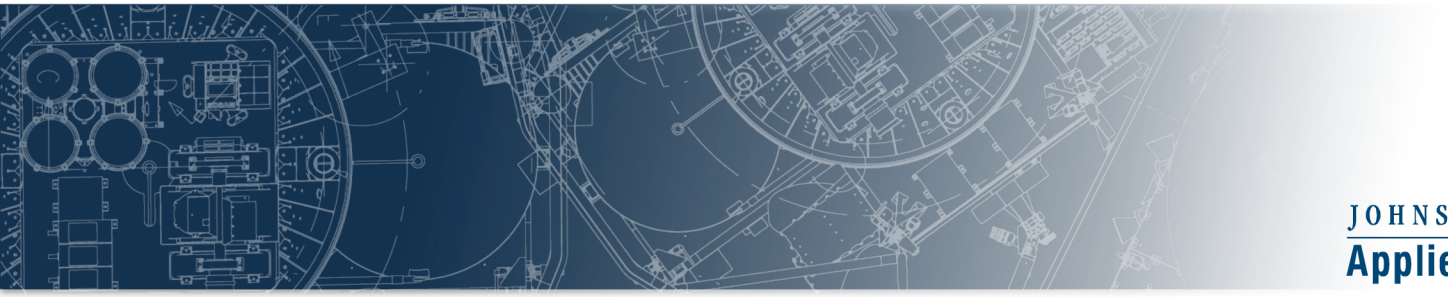

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# Overview

- Summary
- Updates
- Outstanding Comments
- Interoperability Cipher Suites
- Next Steps

# Summary (1/3)

- Motivation for this document
  - In-bundle security mechanism is needed in some cases
    - *Different blocks may have different security needs*
    - *Different nodes may impose different security policy*
  - If you do not want in-bundle security, you can secure BP by having
    - *Users protect their data at the application layer (e.g. secure payload)*
    - *Users select secure convergence layers (if they exist)*

- Design decisions
  - Different blocks in a bundle can have different security
  - Processing order must be unambiguous at a receiver
  - New cipher suites must be able to be added at future dates

# Summary (2/3)

- Block Format
  - Two new extensions blocks defined
    - *Both capture list of targets they act upon, key information, cipher suite configuration, and result information.*
    - *Integrity (BIB) – Holds signature*
    - *Confidentiality (BCB) – Indicates target(s) have had their block data replaced with crypto-text*
  - A security block can target 1 or more other blocks
    - *Multiple targets prevents redundant info in the bundle.*
  - Mechanism provided to add new security blocks in other documents if necessary.
- Block Processing Rules to Enforce Determinism
  - If a BCB target is encrypted, a BIB on that target is also encrypted.
  - A BIB cannot target a BCB or a block protected by a BCB.
    - *There exist BCB cipher suites that also generate integrity signatures*
  - At a receiver, BCBs must be processed before BIBs.

# Summary (3/3)

- Block Processing (cont)
  - Cannot add BIBs and BCBs if bundle represents a fragment.
    - *Can encapsulate in that case.*
  - Nodes determine if they are a security destination by policy.
    - *Dangerous and confusing to have bundle assert internal to itself what the security destination would be.*
- Security Considerations
  - Brief review of attacker types in a DTN, explaining how to apply BCB and BIB in these cases.
  - Explanation for why security policy should be out-of-band configured in the network and not included in the bundle itself.
    - *Namely, a bundle might have blocks dropped by a malicious BPA, so blocks that encode security requirements cannot be relied on.*

# Updates to Sections 1/3

- General
  - Minor editorial clean-up through all sections

- Section 3.5: Block Representation
  - No duplicate targets allowed in a target list.
  - Cipher Suite Parameters: Added illustration. Ref. section 3.10
  - Security Results: Added illustration. Ref section 3.10

# Updates to Sections 2/3

- Section 3.10 – Cipher suite Parms and Result IDs
  - Removed tables of parameter and result types.
  - Noted that these have value within the context of individual cipher suites.

*"Cipher suite parameters and security results each represent multiple distinct pieces of information in a security block. Each piece of information is assigned an identifier and a CBOR encoding. Identifiers MUST be unique for a given cipher suite but do not need to be unique across all cipher suites. Therefore, parameter ids and security result ids are specified in the context of a cipher suite definition."*

*A cipher suite MAY include multiple instances of the same identifier for a parameter or result in a security block. Parameters and results are represented using CBOR, and any identification of a new parameter or result MUST include how the value will be represented using the CBOR specification. Ids themselves are always represented as a CBOR unsigned integer.*

# Updates to Sections 3/3

- Section 4 – Canonical Forms
  - Removed custom canonicalizations of the primary block.
  - All non-primary blocks canonicalized as in BPBis, with following exceptions:
    - *When canonicalizing for confidentiality only include the block type specific data.*
    - *Reserved flags, when specified, are never included in the canonicalization.*
- Removed conformance section (Section 11 in -04)
- Section 11 – IANA Considerations
  - Identified need for registry of cipher suite identifiers.
  - Allocated table for BIB and BCB block types (currently TBD)
- Section 13 – References
  - Added COSE as an informative ref.

# Current Comments

- Some comments received after publish of -05.
- Request that comments go to the mailing list.
- Summary:
  - Allow cipher suites to specify how cipher suite parameters and results are stored within the security block, instead of specifying it in section 3.10.
    - *Essentially make that part of the security block “opaque” and determined by the cipher suite seelcted.*
  - Five cases where MUST is being over-used.
  - Section 8.2.2 makes assertions about the security of sign+encrypt which are too strong
    - *(e.g. that an attacker cannot successfully modify a bundle if they cannot decrypt the bundle).*
    - *Instead, in this situation require a IND-CCA2 encryption scheme.*

# Interoperability Cipher Suites

- Published draft of BPSec interoperability cipher suites
- Integrity
  - BIB-HMAC256-SHA256
    - *The integrity cipher suite provides a signed hash over the security target based on the use of the SHA-256 message digest algorithm [RFC4634] combined with HMAC [RFC2104] with a 256 bit truncation length. This formulation is based on the HMAC 256/256 algorithm defined in [COSE] Table 7: HMAC Algorithm Values.*
- Confidentiality
  - BCB-AES-GCM-128
    - *The confidentiality cipher suite provides cipher text to replace the data contents of the target block using the AES cipher operating in GCM mode [AES-GCM]. This formulation is based on the A128GCM algorithm defined in [COSE] Table 9: Algorithm Value for AES-GCM.*

# Next Steps

- BPSEC
  - No significant problems with BPSec have been identified.
    - *Section -04 to -05 addressed minor updates resulting in not over-specifying in the draft.*
    - *Largest remaining issue appears to be whether BPSec requires formatting of cipher suite specified configuration parameters and results.*
  - Can we resolve this minor issues in the context of last call?

- Interoperability Cipher Suites
  - Need a short period of review and updates.
  - Likely ready for a last call at next IETF.

# Thank you!

Questions?