802.1 Qbf PBB-TE Infrastructure Protection

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Notes

- What should we call the thing that we have been calling a ‘segment’? (ie., a sequence of PNPs, LANs, and bridge relays, beginning and ending with a PNP and alternating LANs and bridge relays with intervening PNPs)?
  - IE., A segment?, a sequence?, a chain? (I called it a *sequence*, but I’m now leaning towards *chain* as a chain is clearly non-directional.

Notes

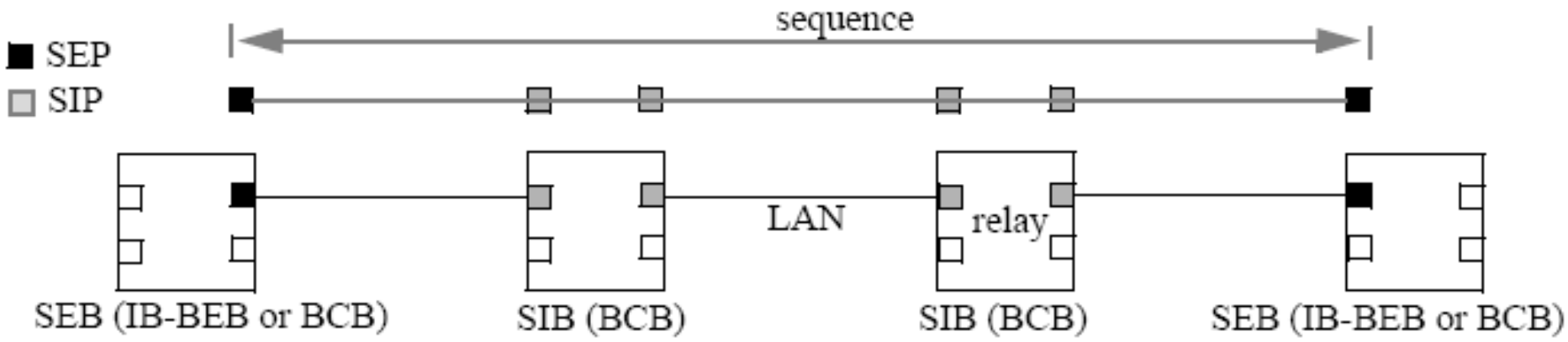

Figure 5-1—A Sequence

Notes

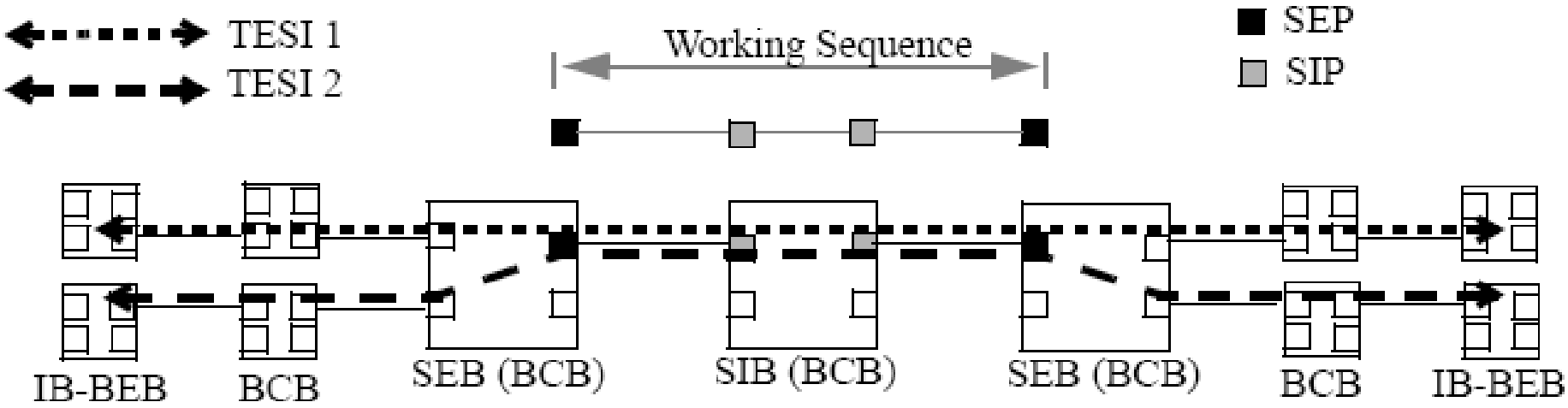

Figure 5-2—A Working Sequence

Notes

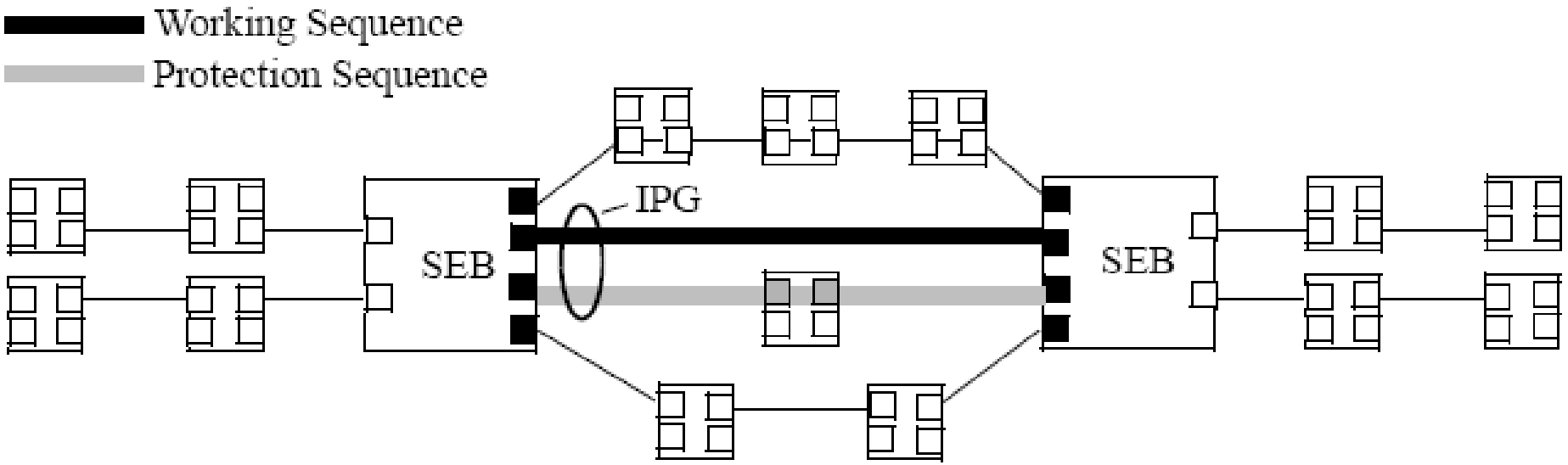

Figure 5-3—A Protection Sequence

- And Infrastructure Protection group (IPG)

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- Particularly if we get rid of the term *segment*, should we amend the PAR to change the title to PBB-TE Infrastructure Protection?
  - I like the idea, but I think we should wait to request a PAR change until we have our terminology very stable.
- Most changes are isolated to new subclause 26.11, patterned on 26.10 End-to-End TESI protection.

Notes

- Separated descriptions of 1:1 and M:1
  - M:1 described (in separate subclause) as deltas to 1:1
- Would like to use existing end-to-end TESI state machines with only low-level procedures modified.
  - So, am using working/protection instead of primary/backup?

Notes

- M:1 protection supported without (significant) change to existing 1:1 state machine by replacing the ‘current’ protection sequence with an ‘alternate’ protection sequence (alternates are ordered and selected alternate must be operational);
- Have provided a ‘placeholder’ 26.11.4 for supporting topologies with ‘shared sequence’ (see cited URL)

Excerpt

26. Principles of Provider Backbone Bridged Network Operation

Insert a new subclause 26.11 as follows:

26:11 Infrastructure Protection Switching (IPS)

<<Editor's Note: As M:1 IPS is an optional feature, the editor has described the extensions to 1:1 IPS needed
to suppor M:1 IPS in a separate section. If M:1 IPS is not implemented, that section could be ignored by the
reader of the standard.>>

<<Editor's Note: This section currently uses the term 'sequence'. Alternatives are 'segment' 'section', 'chain',
etc. It is easy to change the term globally as the document is currently written, but we should try to reach
consensus on this quickly.>>

26.11.1 Introduction

In addition to supporting end-to-end linear protection for point-

Purpose

This standard allows service providers to:

- **Address the relatively high failure rate of particular links or bridges within a network.**
- **Address the likelihood of concurrent failures occurring in different segments of a network.**
- **Allow maintenance activities to be performed independently in different segments of the network.**
- **Allow maintenance activities to be performed in one segment of a network without disabling protection in another segment.**
- **Localize changes in traffic distribution due to failure or maintenance actions.**

Need

- It is anticipated that Traffic Engineered bridged networks will be widely deployed when the PBB-TE (IEEE 802.1Qay) standard becomes available. Currently, only a hierarchy of end-to-end 1:1 TESI protection is specified. Localized infrastructure protection is supported by TDM-based and MPLS-based networks. A simple localized protection capability would strengthen the applicability of PBB-TE networks.

Stakeholders

- Vendors, users, administrators, designers, customers, and owners of traffic-engineered bridged networks.

Other standards with similar scope

- There are no standards providing localized protection for IEEE 802.1Q PBB-TE networks that preserve the frame format. Coordination with ITU on projects with related scope is in progress through overlapping membership as has been the case for prior P802.1 projects.

Five Criteria

Broad Market Potential

A standards project authorized by IEEE 802 shall have a broad market potential. Specifically, it shall have the potential for:

- Broad sets of applicability.
  - The commercial provision of Traffic Engineered services is a large and growing business. This type of localized protection switching would be advantageous.
- Multiple vendors and numerous users.
  - The same large body of vendors and users having a requirement for IEEE 802.1Qay.
- Balanced costs (LAN versus attached stations).
  - This project does not materially alter the existing cost structure of bridged networks.

Compatibility

- IEEE 802 defines a family of standards. All standards shall be in conformance with the IEEE 802.1 Architecture, Management, and Interworking documents as follows: 802. Overview and Architecture, 802.1D, 802.1Q, and parts of 802.1f. If any variances in conformance emerge, they shall be thoroughly disclosed and reviewed with 802.
  - This PAR is for an amendment to 802.1Q designed to be interoperable with existing deployments and does not modify data or control frames (see scope).
- Each standard in the IEEE 802 family of standards shall include a definition of managed objects that are compatible with systems management standards.
  - Such a definition will be included.

Distinct Identity

Each IEEE 802 standard shall have a distinct identity. To achieve this, each authorized project shall be:

- Substantially different from other IEEE 802 standards.
  - This enhancement to 802.1Qay-2009 is distinct because it offers local protection switching while preserving the frame format.
- One unique solution per problem (not two solutions to a problem).
  - There are no other standard solutions to localized recovery with no increase in overhead in a Traffic Engineered bridged network.
- Easy for the document reader to select the relevant specification.
  - This project will amend the only IEEE 802 standard defining Traffic Engineered bridged networks.

Technical Feasibility

For a project to be authorized, it shall be able to show its technical feasibility. At a minimum, the proposed project shall show:

- Demonstrated system feasibility.
  - The function is similar in complexity to PBB-TE end-to-end TESI protection which is currently specified by amendment 802.1Qay to 802.1Q, which has been successfully implemented.
- Proven technology, reasonable testing.
  - The function can be implemented using existing bridge behaviors. Compliance with the project can be tested using straightforward extensions of existing test tools for bridged networks.
- Confidence in reliability.
  - The reliability of the modified protocols will be not be measurably worse than that of the existing Traffic Engineered Bridged networks.

Economic Feasibility

For a project to be authorized, it shall be able to show economic feasibility (so far as can reasonably be estimated) for its intended applications. At a minimum, the proposed project shall show:

- Known cost factors, reliable data.
  - This project introduces no hardware costs beyond the minimal and well-known resources consumed by extending an existing software protocol.
- Reasonable cost for performance.
  - The cost of upgrading software and configuring a priori knowledge of the overall system topology is reasonable for the significant reduction in the time required to recover from a network failure.
- Consideration of installation costs.
  - The cost of installing enhanced software, in exchange for improved network performance, is familiar to vendors and users of bridged networks.