Scalable Selective AIS

David Elie-Dit Cosaque, Atiya Suhail, Oscar Rodriguez, Kamakshi Sridhar

ALCATEL

Introduction

Non-selective AIS – no information about the unreachable MEPs on uppers layers.

- Simple but results in possible incorrect suppression of alarms.

Selective AIS – has information about upper layer unreachable MEPs.

- Accurate, but scales only to a network with limited number of MEPs
- Requires a potentially large MEP List TLV to be sent with each CC message

Proposal: Scalable Selective AIS

- Same benefits as Selective AIS
- But scalable to a large number of MEPs

ALCATEL

Proposal: Scalable Selective AIS

Instead of:

One message with a large number of MEP ID's

Have:

Multiple messages with just 1 MEP ID
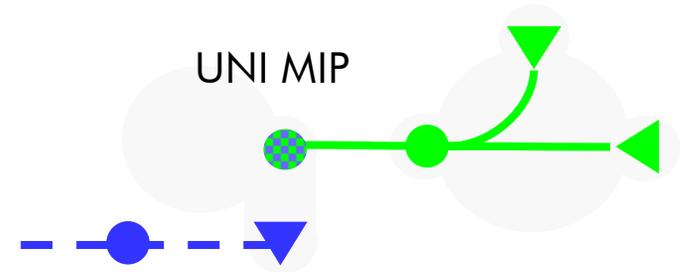
UNI MIP

UNI MIP will insert the MEPID of the MEP below it in a new CFM message:

- Called **SupportAIS – this is not an AIS frame but it supports the functionality of AIS.**
- That conveys location of upper level MEPs relative to lower level provider MEPs
- That is Multicast and Non Periodic

ALCATEL

When is a SupportAIS frame generated?

SupportAIS frames are not periodic but event-driven.
They are generated when:

- MEPs are initialized
- MEPs receive a CC or **SupportAIS** frame from new MEPs
- MEPs receive a **SupportAIS** frame with updated information
- Topology Change occurs
  - A fault occurs, Spanning Tree reconfigures (described next)

ALCATEL

Generation of SupportAIS frame:
when MEPs are initialized
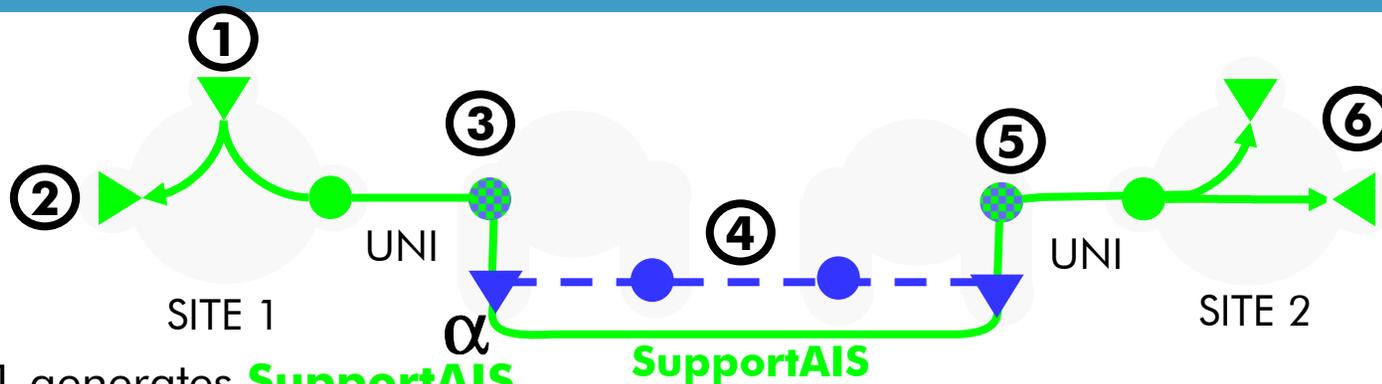
① MEP1 generates **SupportAIS**

② MEP2 receives SupportAIS with an NULL BelowMEP field

  ■ catalogs MEP sending SupportAIS as a local MEP

③ UNI MIP3 stops SupportAIS message and inserts the identifier of the blue provider MEP below (α) in BelowMEP field

④ SupportAIS message is transported across provider network

⑤ UNI MIP5 does not stop the SupportAIS message because it comes from the provider

⑥ Customer MEPs receive **SupportAIS** with a non-NULL BelowMEP field

MEPs in SITE 2 catalog MEPs in SITE 1 as remote MEPs behind blue provider MEP α

July 2005

ALCATEL

IEEE Plenary, San Francisco, CA

How does Scalable Selective AIS work?
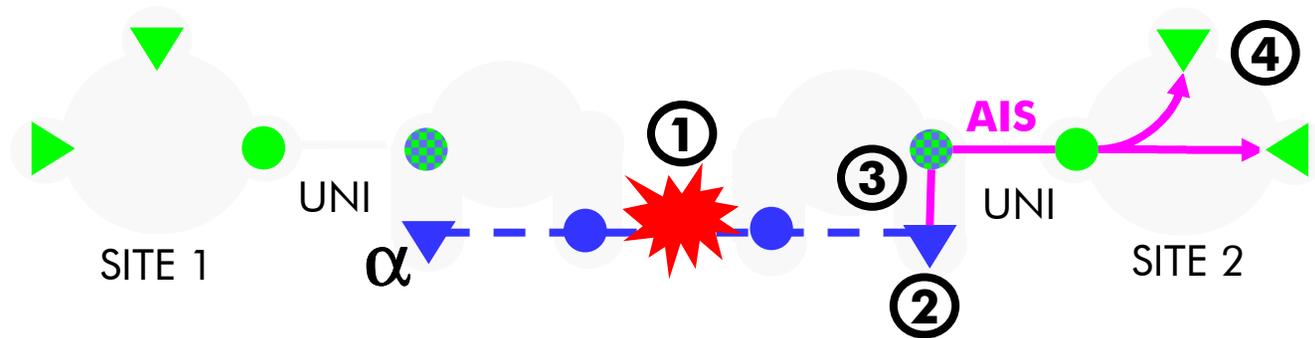
① A fault occurs in the provider network

② CCLoss is detected by provider MEPs

③ Provider MEP generates **AIS** including the identifier of unreachable MEP α with his own identifier (sending MEPID).

④ **AIS** is received by the next higher level MEPs (site 2) and cataloged. It indicates that MEP α is unreachable

From SupportAIS, MEPs in SITE 2 learn that MEPs in SITE 1 are behind α. Since α is unreachable, all customer MEPs behind it are unreachable.

This is the same as Selective AIS but with better scalability.

Generation of SupportAIS frame:
Topology Change

1/3

Alternate

UNI

UNI

Working

SITE 1

SITE 2

α
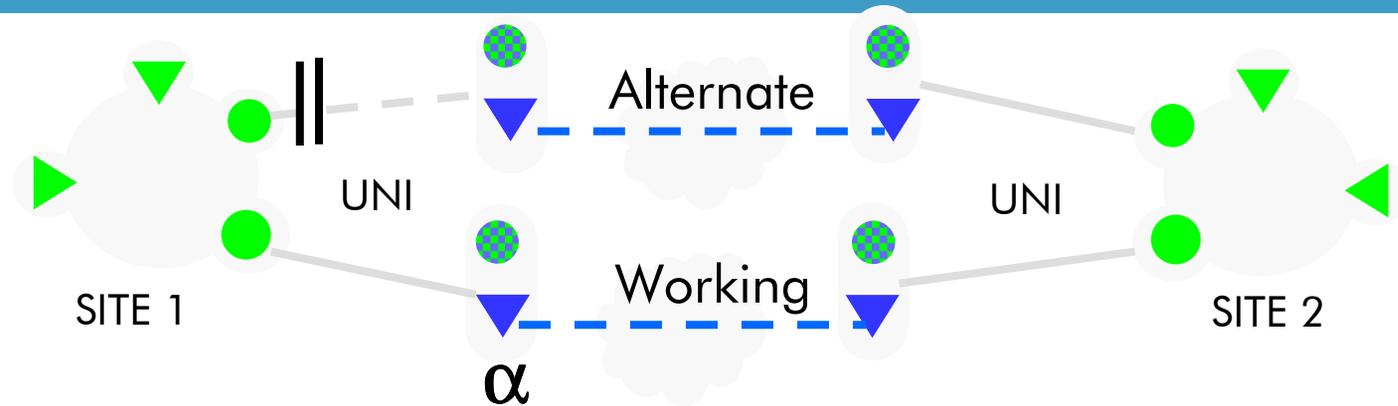
From **SupportAIS**, MEPs in SITE 2 learn that MEPs in SITE 1 are behind α.

Working service goes down and alternate link is activated

Topology Change – Link fault

Alternate

AIS

SITE 1

Working

SITE 2

α

β
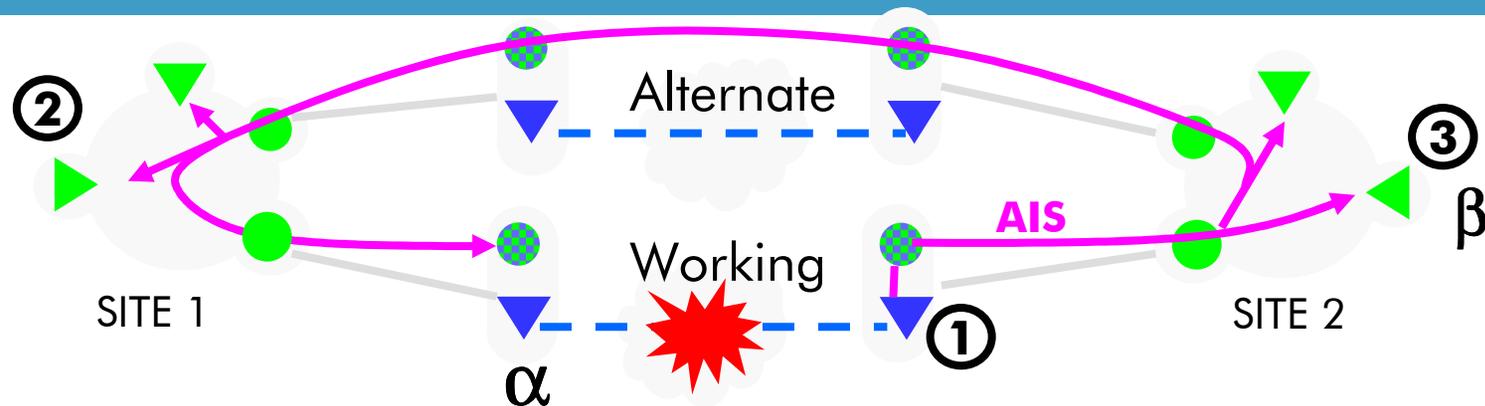
① Provider MEP sends an **Ethernet AIS** containing α **(**and its MEPID 1**)**

② The network recovered → MEP β receives CCs from MEPs in SITE 1

③ MEP β detects a contradiction:

  ■ AIS indicates that α is unreachable and so must be all MEPs in SITE 1

  ■ CC frames from MEPs in SITE 1 indicate reachability of MEPs in SITE 1

MEP β deduces that MEPs in SITE 1 moved and hence a topology change occurred → MEP β must send a SupportAIS frame.

Generation of SupportAIS frame:
Topology change – Port fault
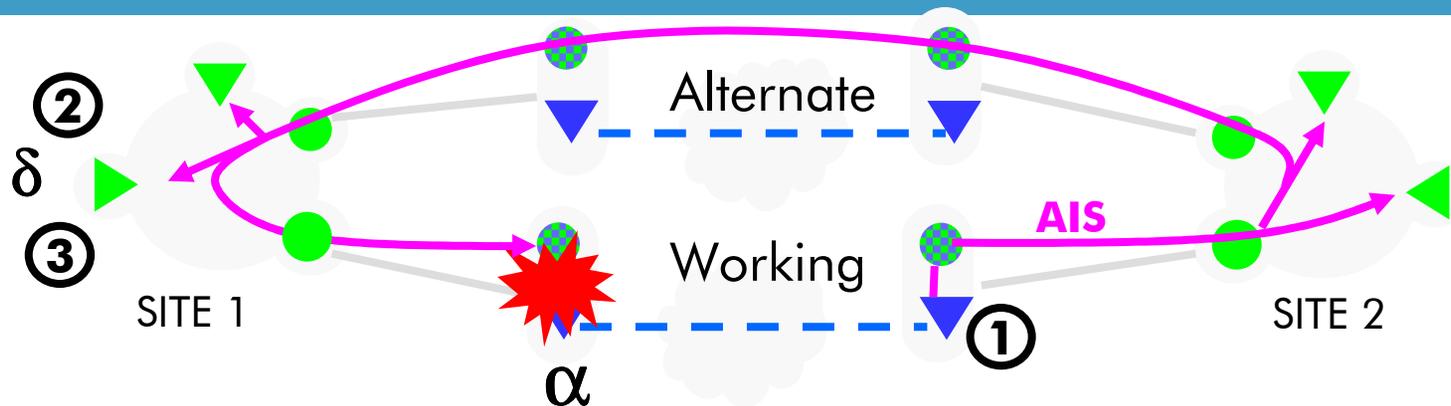
① Provider MEP sends an **Ethernet AIS** containing α and its own MEPID1

② The network recovered → MEP δ receives **Ethernet AIS** from MEP1
   AIS indicates that α and MEP1 (the one that sent the AIS) are unreachable
   δ suppresses alarm for remote MEPs with belowMEP indicating α or MEP1
   Alarms are correctly suppressed at δ even if MEP α does not send AIS (port failure).

③ MEP δ detects a contradiction (below) and sends a **SupportAIS:**
   ■ δ receives CCs from MEPs in SITE 2
   ■ δ receives Ethernet AIS indicating that MEPs in SITE 2 are unreachable

Benefits of new proposal

SupportAIS frame specifies only 1 additional header field encoding only 1 MEP identifier.

SupportAIS frame is sent less often than CC (once/sec), Hence it does not consume as much bandwidth.

Hence this solution scales well.

ALCATEL

www.alcatel.com

July 2005

ALCATEL

IEEE Plenary, San Francisco, CA

Hardware considerations – merging with CC

Scalable Selective AIS can be implemented in hardware

- Reuse of the CC frame to carry the additional MEP identifier (BelowMep ID)

- The BelowMEP header field is added in hardware.

  - Well suited for hardware → MEP always add the same BelowMEP ID value (Himself) to each CC frame header.

ALCATEL