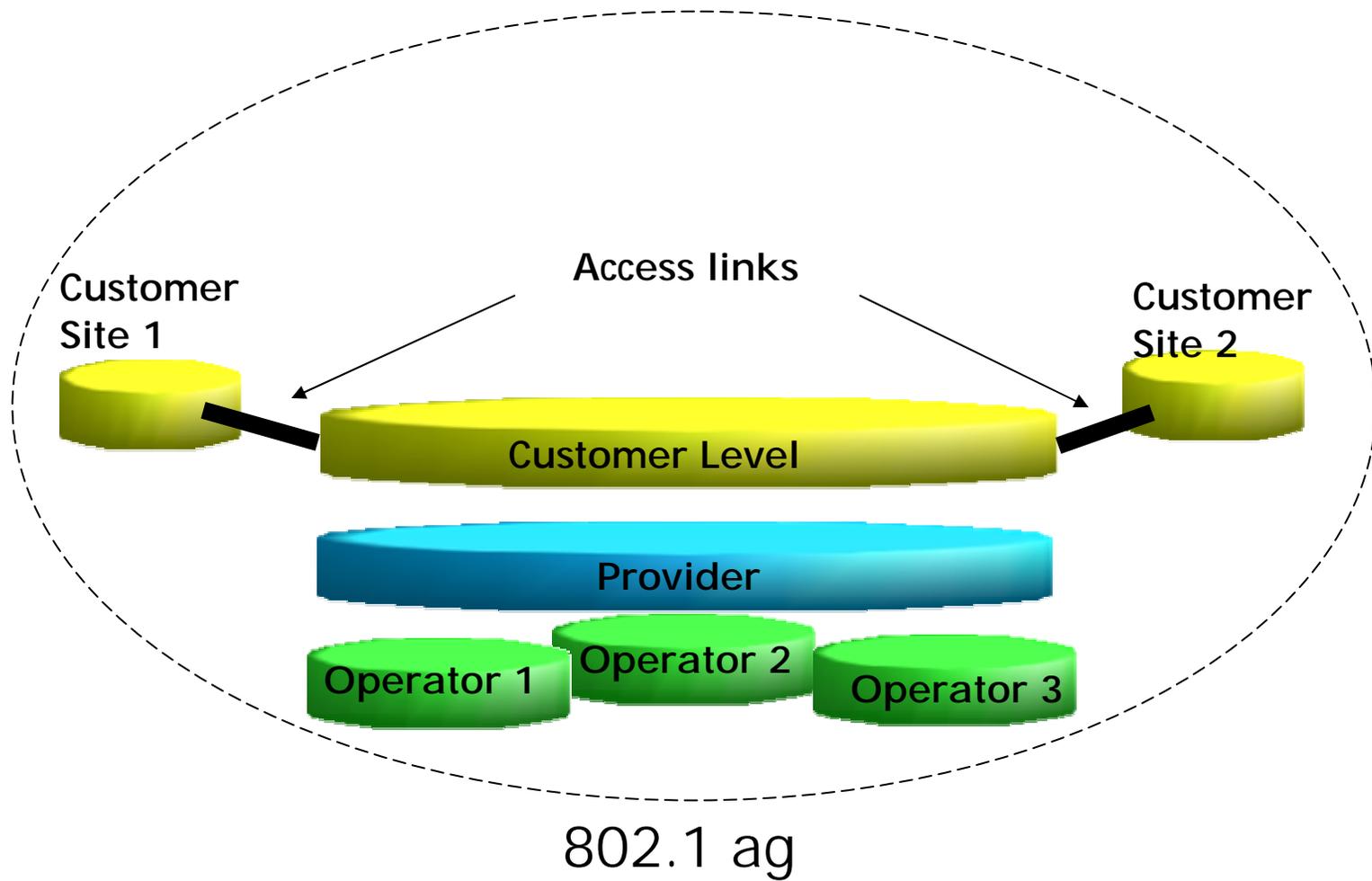# Ethernet Alarm Indication Signal (EthAIS)

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Maarten Vissers, Tony Van Kerckhove

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Scenario

Access links

Customer
Site 1

Customer
Site 2

Customer Level

Provider

Operator 1

Operator 2

Operator 3

802.1 ag

Connectivity Check (CC)

> CC provides monitoring of MP pairs (also called Maintenance Entity in ITU)

> A customer using Provider Ethernet service has no immediate way of knowing whether a fault :

- originates at his level, so that he can fix it
- originates from a level below, so he can wait for the problem to be fixed, and maybe impose penalties.

> **Alarm suppression is needed for 802.1ag**

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Solution: AIS

> To differentiate between faults at customer level and faults at provider level (Alarm suppression, Penalties)

> Customers need not raise alarms due to lower level failures

> Customers can get refund based on service unavailability

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EthAIS signal

> **A new Ethernet Alarm Indication Signal (EthAIS) can provide this functionality**

> **A new OAM frame is defined with the following fields**

- Sequence number
- Fault cause location, fault cause type
- Operator ID
- AIS level indication
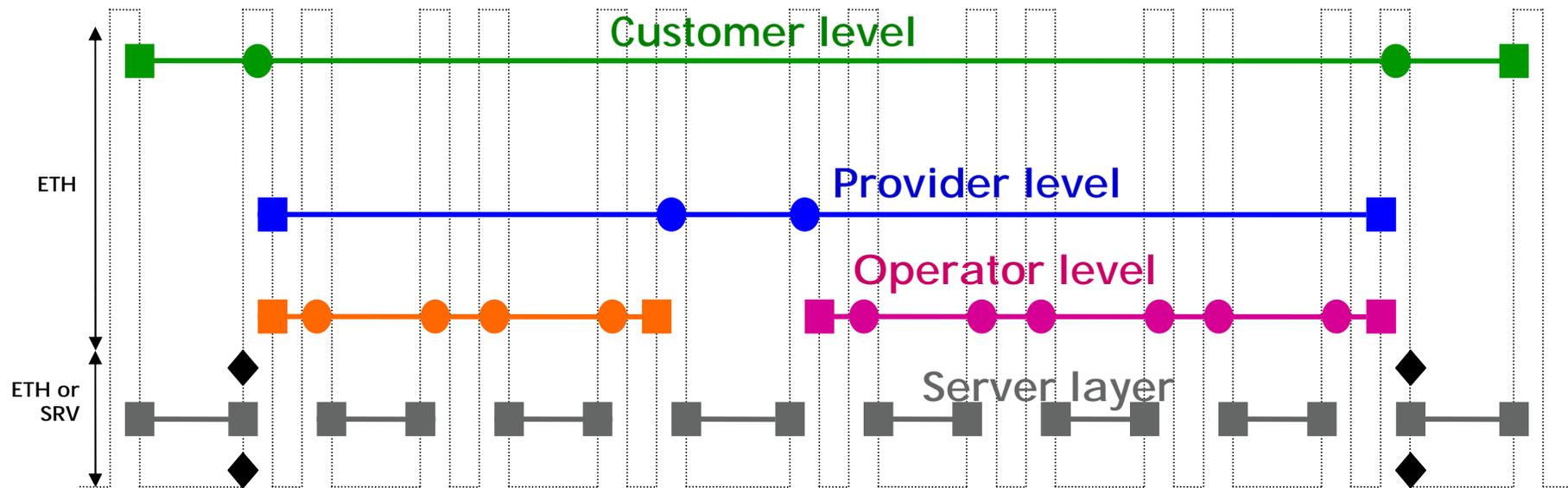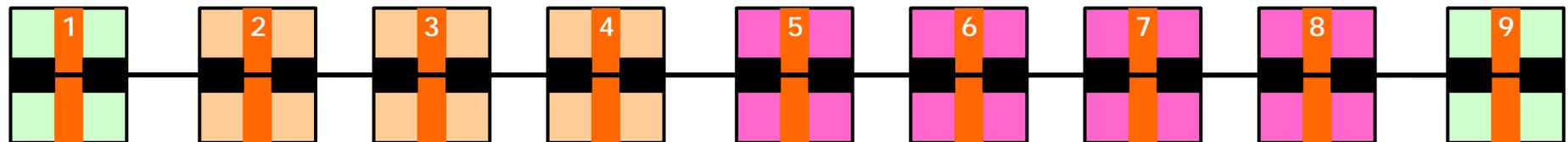- Optional fields: Time count AIS, Time count AIS clear

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OAM architecture

Customer Equipment — Operator A Bridges — Operator B Bridges — Customer Equipment

Customer level

Provider level

Operator level

Server layer

ETH

ETH or SRV

■ Maintenance point
● Loopback point

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How do we suppress alarms?

> MP receiving an AIS can recognize that fault is in lower levels

> MP can then suppress alarms at current level

> **Higher levels can track lower level faults**

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EthAIS Signal

> EthAIS frame is multicast regularly during a fault

> LPs send **EthAIS** upon detection of a **link failure**

> MPs send **EthAIS**, upon detection of a **CCloss**

> EthAIS are transmitted by MP toward upper levels

> **EthAIS fault clear** indicates that a fault has cleared

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EthAIS - Link failure

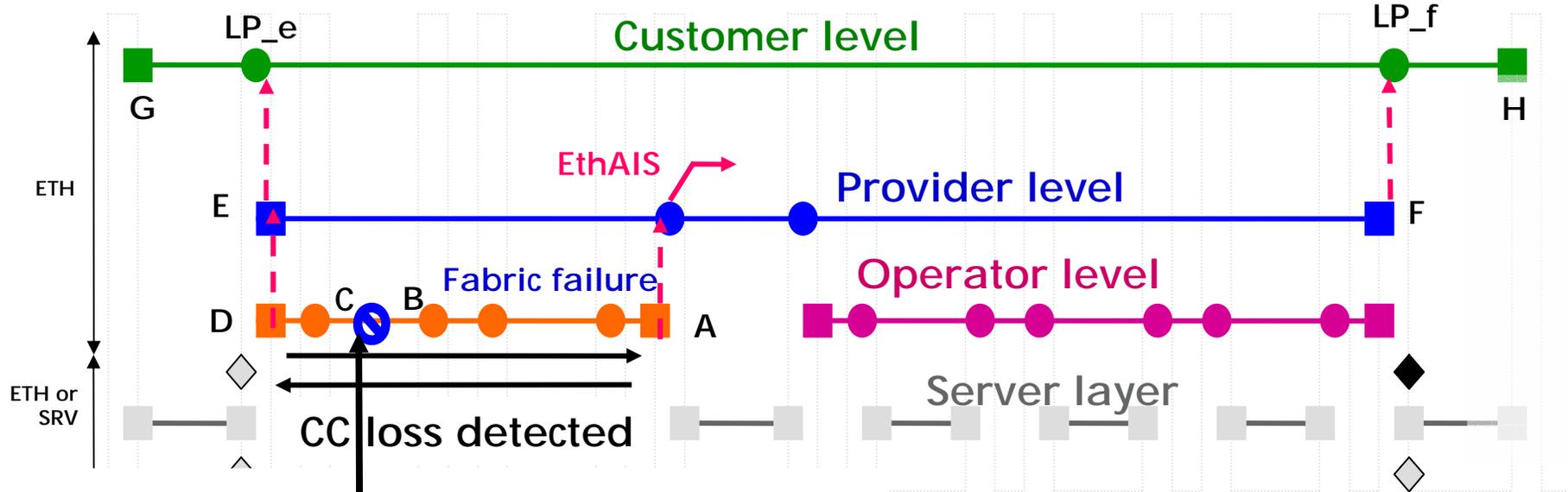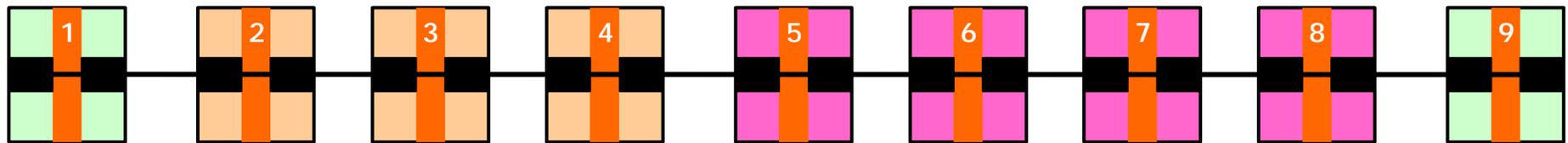Customer Equipment | Operator A Bridges | Operator B Bridges | Customer Equipment
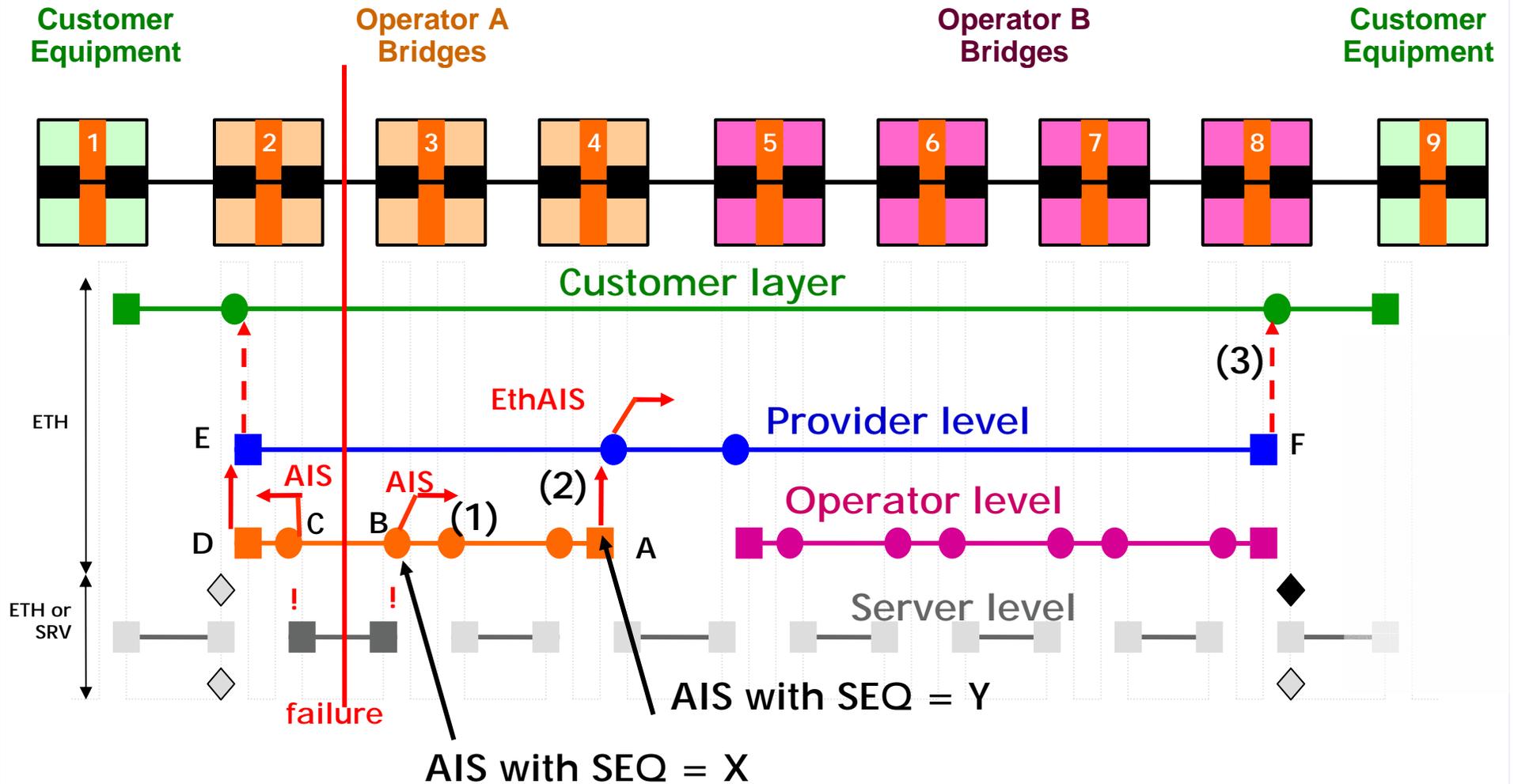
Failure time count (optional)

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EthAIS - CCLoss

Customer Equipment **Operator A Bridges** **Operator B Bridges** **Customer Equipment**

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Fault Clear AIS

Customer Equipment   **Operator A Bridges**   **Operator B Bridges**   **Customer Equipment**

Customer level

Provider level

Operator level

Server layer

ETH

AIS-fault-clear

ETH or SRV

AIS-fault-clear

AIS-fault-clear

AIS-fault-clear

E

D

C

B

(1)

(2)

A

F

ok   ok

Failure repaired

EthAIS with SEQ = Y

EthAIS with SEQ = X
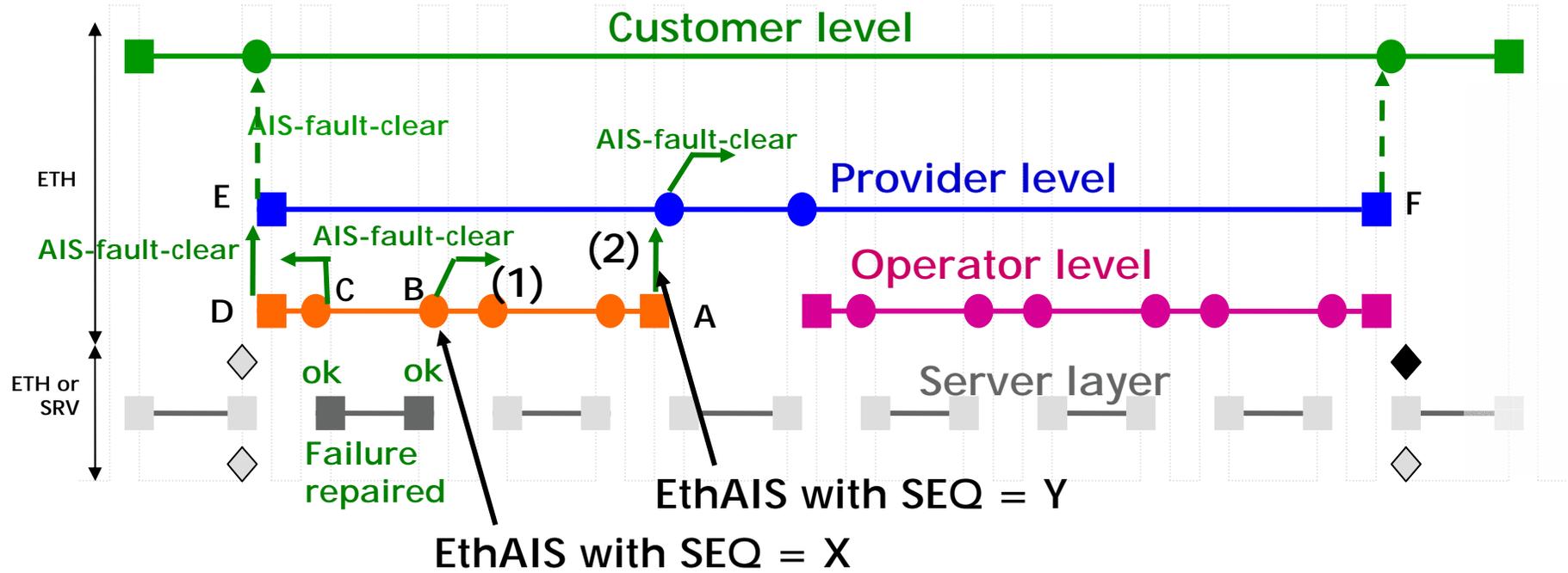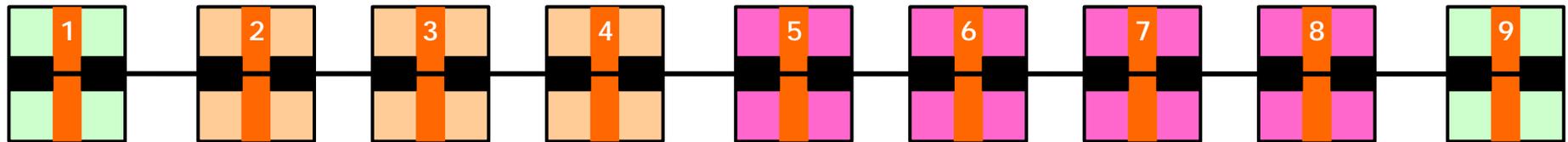
Failure clear time count (optional)

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EthAIS frame

Destination Address	Source Address	VLAN ethertype	VLAN tag	OAM ethertype	OAM level	Version	Reserved	OpCode	OpCode specific

Sequence number	Fault location	Fault Cause Type	Operator ID	Time count AIS	Time count AIS clear

Port ID TLV	Chassis ID TLV
(2)	(1)

Optional

(1)

TLV Type 000 0001	Chassis ID Information String Length	Chassis ID Subtype	Chassis ID
7 bits	9 bits	1 octet	1 ≤ n ≤ 255 octets
TLV Header		Chassis ID Information String	

Figure 9.4 Chassis ID TLV Format

(2)

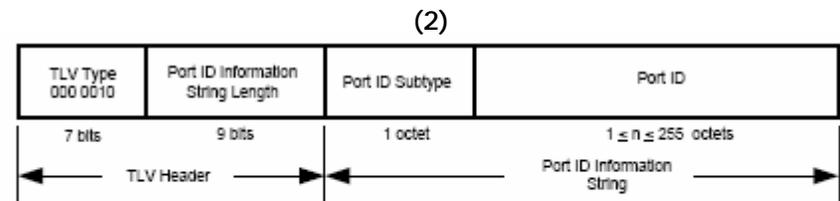| TLV Type 000 0010	Port ID Information String Length	Port ID Subtype	Port ID
7 bits	9 bits	1 octet	1 ≤ n ≤ 255 octets
TLV Header		Port ID Information String	

Figure 9.5 Port ID TLV Format

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Fields (1/2)

> **Sequence number (#)**: uniquely identifies AIS sent by a given "fault location"

> **Fault cause location field - filled with 802.1ab MAC Service Access Point (MSAP) TLV**: includes port ID and chassis ID. MP's replace the MSAP of incoming EthAIS with their own MSAP.

> **Fault cause type - code point for several faults** (CCLoss Indication, Link failure Indication, Fault clear AIS, etc)

> Fault cause type and location - used in G.709, and Y.1711

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Fields (2/2)

> **Operator ID** - indicates who to contact in event of failure - used in G.709 (9 bytes)

> **Within a level, an EthAIS is uniquely identified by its Source MAC@, fault cause location, and Sequence #**

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Optional fields

> **Until now we assumed that the transport layer is reliable.**

> If the Ethernet transport layer is unreliable, then additional measures are needed to ensure reliability of AIS frames.

> **Time Count AIS:** indicates how long a fault has been present

> **Time Count AIS Clear:** indicates how long ago the fault cleared

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Summary

> EthAIS enables customers to suppress provider fault alarms

> EthAIS enables customers to monitor service availability

> New OAM frame requires only one OAM Opcode

> **EthAIS is an important component of Ethernet OAM**

> **A new OAM frame has been proposed**

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Thank you

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