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            Requirements of Abstract Alarm Report in ACTN architecture
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Abstract

   This draft provides a set of requirements for alarm abstraction and
   report of transport networks in the ACTN architecture.

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[1]. Introduction

   This draft provides a set of requirements for alarm abstraction and
   report in ACTN architecture. [ACTN-frame] defines the base reference
   architecture and terminology.

   [Section 2] provides the requirements for alarm report in ACTN
   architecture. [Section 3] provides some solutions for alarm
   abstraction of transport networks.

[2](#). Requirements for Alarm Report in ACTN Architecture

   In ACTN architecture, Physical Network controller (PNC) can access
   to all of the network resources and alarm information, and provides
   an abstracted view of transport network resources to upper layer
   controller based on different abstraction policy. Multi-Domain
   Service Controller (MDSC) gets the abstracted network resource
   information, and shields the networks resources details to Customer
   Network Controller (CNC).

   How to report alarm between PNC and MDSC or between MDSC and CNC is
   related to the abstraction policy. In figure 1, several different
   abstraction particles are listed as follow.

   1) The NE1, NE2 and NE3 in PNC1 is abstracted as NE1', the NE4, NE5
      and NE6 in PNC1 is abstracted as NE2' in MDSC.

   2) The NE7 and NE8 managed by PNC2 is abstracted as NE3' in MDSC.

   3) The multiple links between NE2 and NE4, which is abstracted as a
      link between NE1' and NE2', uses a link bundling mechanism, and
      the bandwidth of this link in MDSC is bound to the sum of
      bandwidth of bundling link in PNC1.

   4) MDSC can shield the network resources details, and only provides
      the information of the edge node and the connection relationship
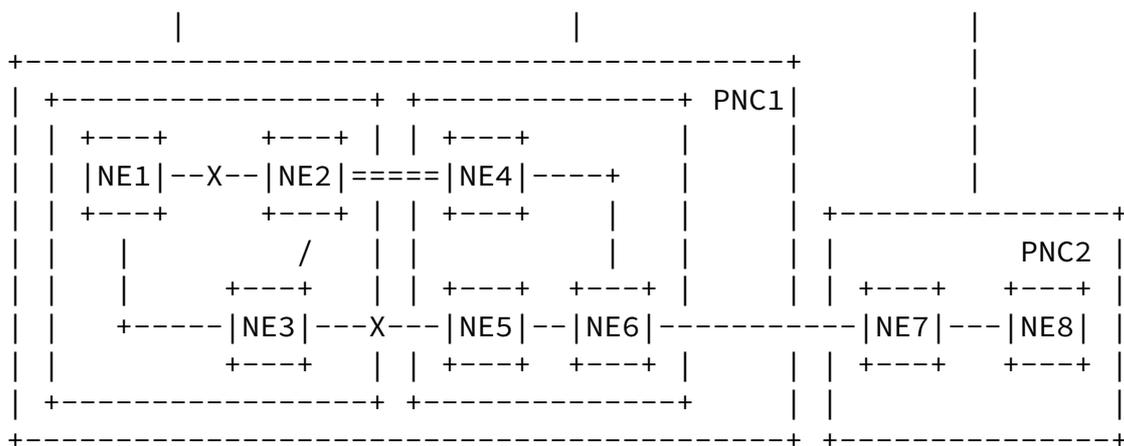   between these nodes.

```
      +---------------------------------------------------------+
      |    +-----+                                      +-----+ |
      |    |NE1''|--------------------------------------|NE2''| |
      |    +-----+                                      +-----+ |
      |CNC  /|\                                          /|\    |
      +------|-------------------------------------------|----+
             |                                           |
      +------|-------------------------------------------|----+
      |    +----+                 +----+                 +----+ |
      |    |NE1'|----------------|NE2'|----------------|NE3'|   |
      |    |    |--------X------|    |                 |    |   |
      |    +----+                 +----+                 +----+ |
      |MDSC /|\                    /|\                    /|\   |
      +------|---------------------|---------------------|----+
```

```
         |                       |                       |
  +------------------------------------------+          |
  | +----------------+ +-------------+ PNC1|          |
  | | +---+     +---+ | | +---+       |    |          |
  | | |NE1|--X--|NE2|=====|NE4|----+  |    |          |
  | | +---+     +---+ | | +---+    |  |    | +--------------+
  | |  |        /   | |    |       |  |    |         PNC2  |
  | |  |     +---+  | | +---+  +---+|  |    | | +---+   +---+ |
  | |  +-----|NE3|---X---|NE5|--|NE6|----------|NE7|---|NE8| |
  | |        +---+  | | +---+  +---+|  |    | | +---+   +---+ |
  | +----------------+ +-------------+   | |         |
  +------------------------------------------+ +-------------+
```
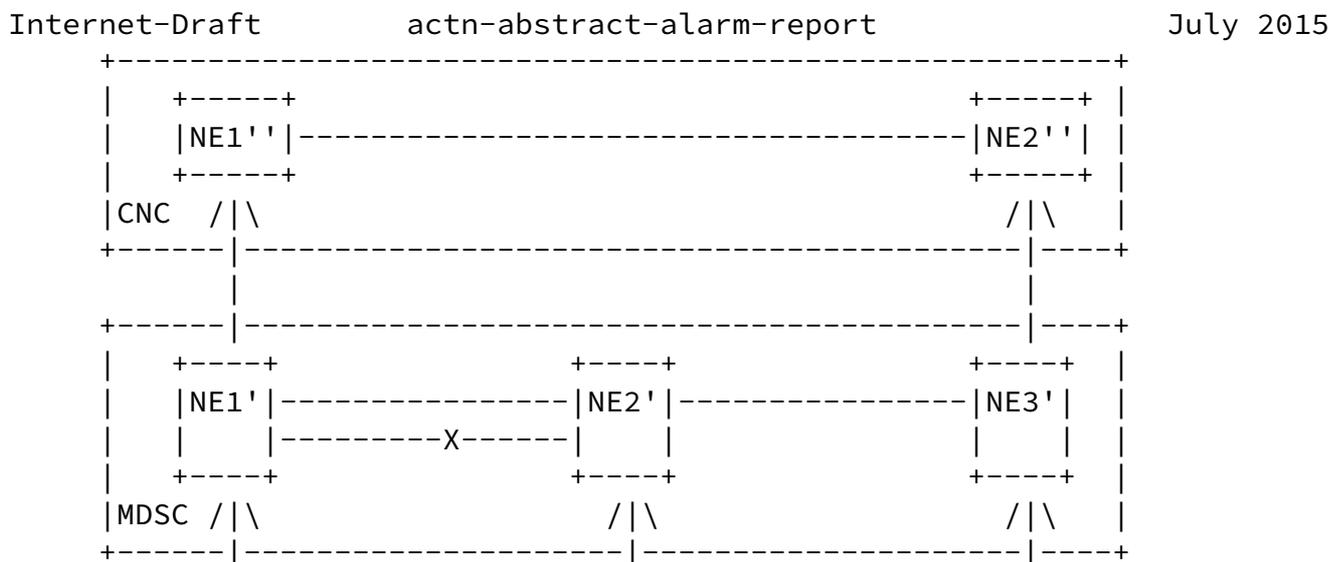
                Figure 1 Error Report in ACTN architecture

   Based on the different abstract methods, when the underlying network
   resource error occurs, the requirements of alarm reporting mechanism
   is also different.

   1) PNC is able to collect all of the underlying network resource and
      alarm information.

   2) When an error occurs in the link between the NE1 and NE2 in PNC1,
      it shouldn't report an alarm to MDSC, but report the network
      resource status has changed inner the NE1', such as the
      connectivity between the port of NE1', or the maximum available
      bandwidth has changed, etc..

   3) When one of a link between the NE2 and NE4 failures, PNC1 should
      report the bundling link bandwidth changes to MDSC.

   4) When the link between NE3 and NE5 failures, it is abstracted as a
      link in MDSC, and the PNC1 should report the alarm information,
      indicating that the link is faulty.

   5) In addition, when the underlying network resources failure, due
      to the abstract policy, PNC reporting the resource status changes
      to MDSC, such as abstract node internal state changes and
      abstract link bandwidth property changes, when the upper
      controller MDSC or CNC received these state changes, it cannot
      correlation the state changes to the network connections which
      are impacted. Therefore, the underlying controller PNC or MDSC
      should report the impact of the LSP and alarm information, the
      upper layer controller based on these information and correlated

with the connection it stored.

3. Abstract for alarm report in ACTN architecture

    3.1. Status changes report inner abstract node

TBD

    3.2. Status changes report inner abstract link

When an error occurs in a bundling link, the following information
should be reported.

- Domain ID;

- Bundling link ID;

- Available Bandwidth;

- Reason for status change;

- Occurrence time.

    3.3. Alarm report for abstract node and link

When an error occurs out of a bundling link or for an abstract node,
follow alarm information should be reported.

- Domain ID;

- Abstract node ID or abstract link ID

- Alarm reason;

    - Alarm level;

    - Occurrence time.

    3.4. Abstract alarm report for connection

When an error occurs and it impacts a network connection, the follow

alarm information should be reported.

- Domain ID;

- Abstract network connection ID;

- Alarm reason;
- Alarm level;

- Occurrence time.

4. Security Considerations

This document raises no new security issues.

5. IANA Considerations

No new IANA considerations are raised by this document.

6. References

6.1. Informative References

[ACTN-Frame] D. Ceccarelli, et al., "Framework for Abstraction and
          Control of Transport Networks", draft-ceccarelli-actn-
          framework, work in progress.

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