ForCES LFB Subsidiary Management

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Background

- Per the updated ForCES charter (http://datatracker.ietf.org/wg/forces/charter/), the LFB Subsidiary Management work is within the scope
  - Deployment experience has demonstrated the value of using ForCES to control the **Forwarding Element Manager (FEM)** by creating an LFB to represent its function using the same encoding rules as for any other LFB. This allows it to be controlled by the same **Control Element (CE)**
  - This work item assumes the **presence of an initially booted FE** whose configuration could then be **updated** at runtime via an FEM LFB for runtime config purposes (e.g., by adding a new CE and its associated IP address).
  - This work item can also be useful in addressing **control of virtual FEs** where individual FEM Managers can be addressed to control the creation, configuration, and resource assignment of such virtual FEs within a physical FE
  - This work would result in a standards track LFB FEM library RFC
Outline

• Virtualization of CE and FE
• Updated VCE-VFE Model
• A Preliminary Scenario
  – Sequence of Events in FEM
  – Implementation Option(s)
• Another Potential Scenario
  – Sequence of Events
• Next Step(s), Q&A, and Discussion
• THANKS!

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Virtualization of CE and FE

CE-Visor

Dynamic Assignment/Allocation

CE (an instance for use in VCE-VFE Model)

(Distributed) Physical Hardware resources for CE

VCE

Master-Primary (dynamically assigned role)

VCE: Virtual CE

VCE

Master-Secondary (dynamically assigned role)

FE-Visor

Dynamic Assignment/Allocation

FE (an instance for use in VCE-VFE Model)

(Distributed) Physical Hardware resources for FE

VFE

Master-Primary (dynamically assigned role)

VFE: Virtual FE

VFE

Master-Secondary (dynamically assigned role)
Updated $\textit{VCE-VFE}$ Model
A Preliminary Scenario
(Recovery from FE Failure)

• An FE can initially boot using a default Association and Configuration
  – The A & C can be updated at runtime via an FE-Visor/FEM LFB for runtime configuration purposes
    • For example, by adding a new CE and its associated IP address

• A CE can initially boot using a default Configuration and State(s)
  – The C & S can be updated at runtime via a CE-Visor/CEM LFB to satisfy runtime requirements
Sequence of Events in FEM (an example)

• Step-1: Hypervisor boots up with FEx that connects to a CEy and CEw

• Step-2: Control App (attached to CEy) instructs FEx to boot an FE-type VM

• Step-3: FEx boots FEz and instructs it to connect to CEy

• Step-4: Control application instructs FEz to also connect to CEw
  – this is essentially the "A" part of A&C, as discussed in slide no. 6 (Potential Scenarios)

• Step-5: Control application instructs FEz to increase its syslog debug level
  – essentially this is the "C" part of A&C, as discussed in slide no. 6 (Potential Scenarios)

Step-4 (FEM part of the charter) and Step-5 are what we would like to achieve
Sequence of Events in FEM

1. Boot up FEx, and connect to CEy and CEw
2. Boot a VM of Type FE
3. FEx Boots FEz, and connects to CEy
4. Connect to CEw

To Apps/Services

Orchestration

Controller

Hypervisor

FEM

FE

Manage-ment FE

FE

FE

CE

CE

CE
Implementation

• Please see the demo during Bits-N-Bites session on Thursday, 7 Nov. 2013 at 7 PM in Regency D/E/F
  – Looking for further inputs/suggestions
Another Potential Scenario
(Recovery from CE Failure)

• **A CE** can initially boot using a default **Association, State, and Configuration**
  – The **A & C** can be updated at runtime via a CE-Visor/CEM-LFB for runtime configuration purposes
  • For example, by adding a new CE and its associated IP address

• **An FE** can initially boot using a default **Configuration, Association (with a CE) and State**
  – The **C & A** can be updated at runtime via a FE-Visor/FEM LFB to satisfy runtime requirements
Sequence of Events (an example)

• CEx is Active with CEy as its Standby with Standby/Active or Active/Active setup

• CEx controls FEy and FEw with both FEy and FEw having Standby control links to CEy (with Standby/Active or Active/Active setup)
  – CEx and CEy are controlled (assigned) by CE-visor, and may have a common (virtual) IP address
  – The Controller is fully aware of the status of all of the CEs – physical and virtual

• When CEx fails, its states are fully transferred (may already be synced) to CEy
  – The Standby links from CEy to FEy and FEw become fully active
  – The control (of FEy and FEw) is fully transferred from CEx and CEy

• Graceful/smooth failover of CEx to CEy is now successfully complete, and SysLog debug level for CEy is increased

The last two steps are concerned with Subsidiary management
Implementation

• In progress, looking for inputs/suggestions
Next Steps

- Continue preparing the draft
  - Welcome Contributions/Participations from others

- Comments/Suggestions
Q&A, and Discussion

THANKS!
Misc. Additional Information
Application and Orchestration

• Applications can adapt based on
  – Loading and Recovery status
  – Pre- and post-condition(s)
  – Other Requirements

• Orchestration
  – Multiple CE/VCE scenarios
  – Handling of Bursts and/or Multiple Conflicting Requests from the Apps/Services
CE/FE/LFB Life Cycle Management

Allocate (from the Pool of healthy Ones)

Activate/Commission

Monitor (for SLA) & Replace (if needed)

Return to the Pool of healthy Ones

Sanitize & Test (Fix, if needed)

Release (After allotted time has elapsed)

START

END