SOL002 Adapter - Guilin

Note: Due to the resource issue, this SOL002 Adapter is moved to the Honolulu release under REQ-400.

Introduction

SOL002 Adapter is similar ETSI adapter as SOL003 and SOL005 that does conversion of ONAP functionality to ETSI MANO functionality and back. Architecture and placement in ONAP should be inline with other ETSI adapters and all common functionality should be shared and implemented just ones e.g.

- Security
- HPA
- Any other ONAP functionality e.g. AAI access, Policy access, Logging.

All ETSI adapters should also shared common code base for ETSI models, DTOs and interface implementation as those will be technically very same towards external MANO.

Use Cases

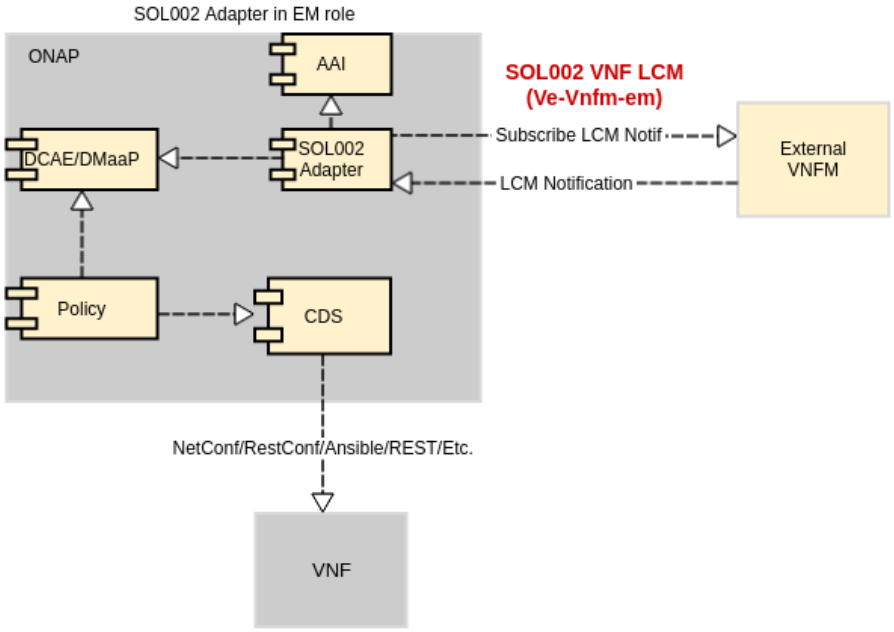
VNF LCM (Ve-Vnfm-em)

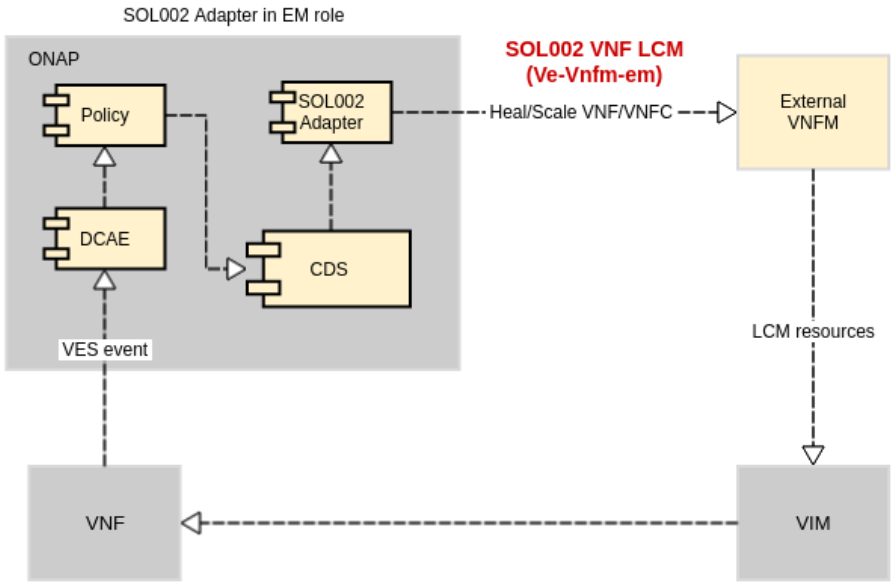
SOL002 VNF LCM interface use can be divided to 2 separate sub-use cases:

1. **LCM Notification Subscribing/Consuming**
   - At startup SOL002 Adapter can subscribe LCM notifications from VNFM
   - When receiving notifications SOL002 Adapter can perform actions e.g.:
     - Clean up VNF related Close Loop when receiving VNF terminated notification
     - Configure VNF when receiving VNF Instantiated/Healed/Scaled notification.
2. LCM Action execution **(NOT FOR GUILIN)**
   - ONAP Close Loop gets triggered from VES event or by other means and can trigger SOL002 Adapter to perform action using VNF LCM interface

Benefits:

- VNFC level LCM actions (compared to SOL003 which only allows action at the VNF level)





VNF Indicator Interface (Ve-Vnfm-em)

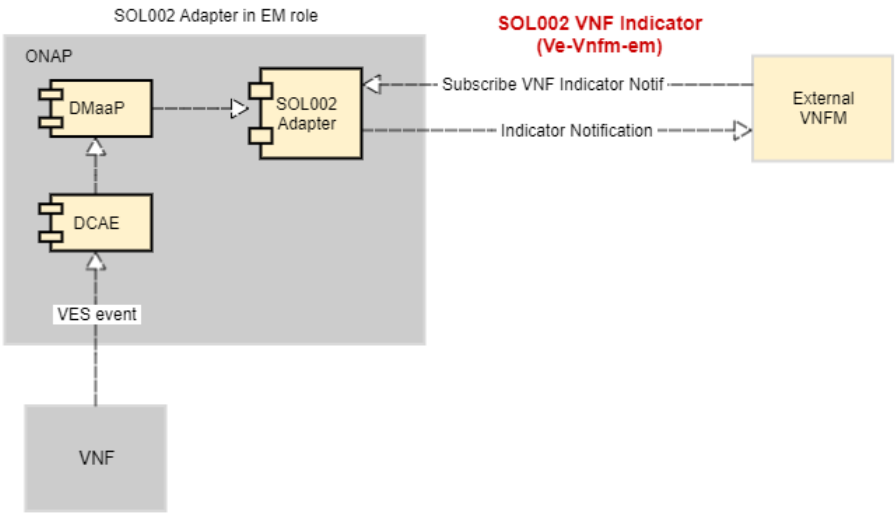
External VNFM can subscribe to SOL002 VNF Indicator notifications.

SOL002 Adapter reads VNF specific VES events from DMaaP according to subscriptions and converts events to SOL002 interface format and sends as Notify events to external VNFM.

Note: **(NOT FOR GUILIN)**

Benefits:

- Enables ETSI style Close Loops in VNFM (for VNFs supporting ONAP VES events)



Feature Descriptions

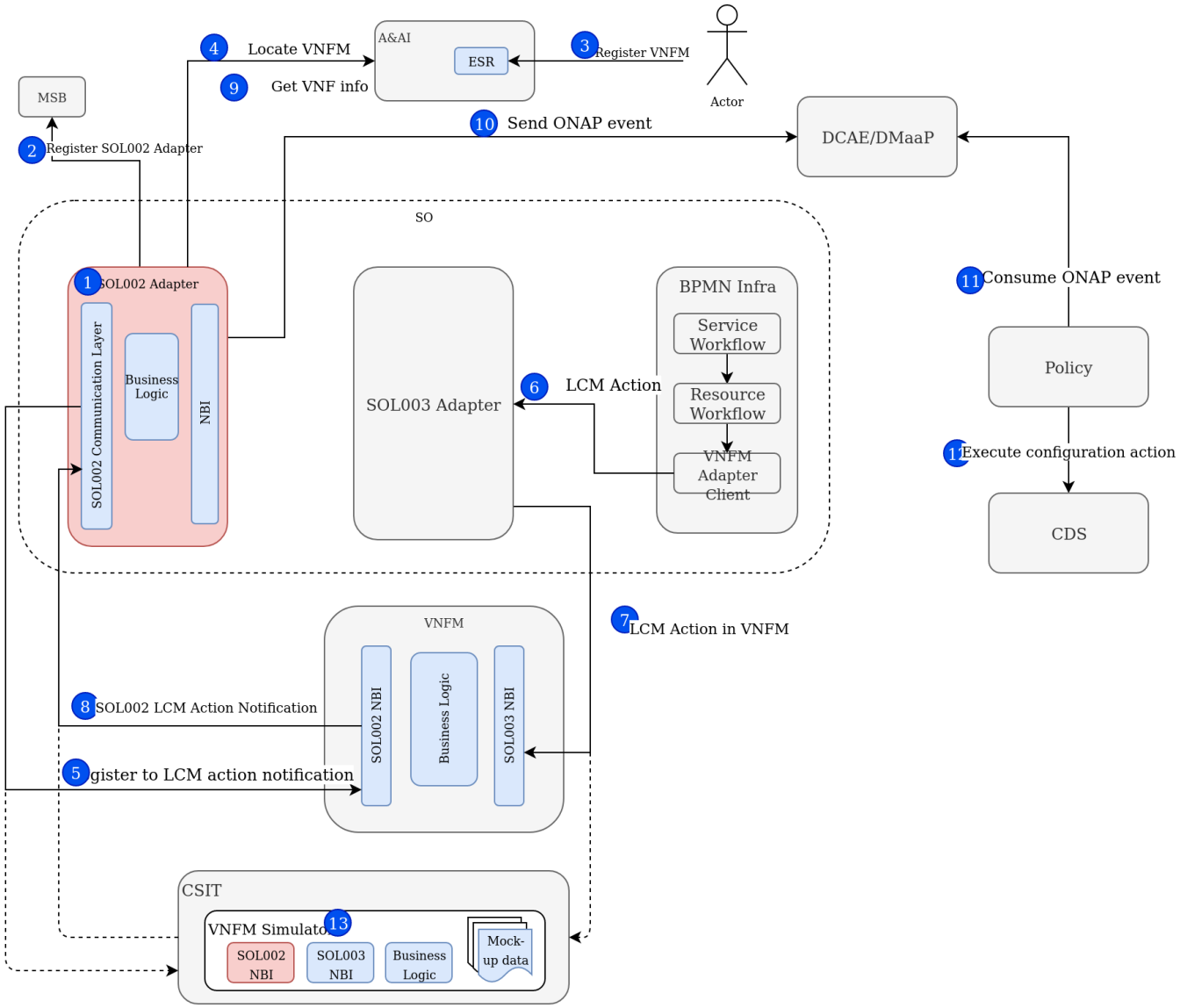
Feature	Description
SOL002 Adapter subscribes and consumes VNF LCM notifications from VNFM	SOL002 Adapter utilizes VNFM exposed SOL002 VNF LCM interface to subscribe LCM Notifications: • SOL002 Adapter subscribes LCM notifications at startup (e.g. listen all notifications) • SOL002 Adapter receives LCM notification and emits event to DCAE e.g. for Policy to consume • User should model action Policy to react to these events on ONAP side • Based on modeled action some operation can be done. E.g. with ONAP Controller to configure VNF. Clean Close loop etc.
SOL002 Adapter executes VNF LCM operations towards VNFM	SOL002 Adapter utilizes VNFM exposed SOL002 VNF LCM interface: • ONAP DCAE/Policy executes Close Loop based on VNF or VNFC level events • ONAP Controller or SOL002 Adapter directly can react to Policy trigger as Policy actor to perform LCM operation for VNF • SOL002 Adapter is used to translate LCM action to SOL002 interface format towards external VNFM • External VNFM performs VNF resource changes (VNFC or VNF level)
SOL002 Adapter receives subscription and sends VNF Indicator notifications to VNFM	SOL002 Adapter exposes VNF Indicator subscription endpoint and sends Indicator notifications to external VNFM: • VNFM calls SOL002 Adapter to subscribe VNF Indicator notifications • SOL002 Adapter stores subscriptions according to standard • SOL002 Adapter starts to listen DMaaP events based on subscription • SOL002 Adapter consumes any matching events and translates events to SOL002 Indicator notification and sends to subscriber

Epic and User Story

Epic	User Story	Description	Is Guilin?	JIRA
SOL002 Adapter		Epic: SOL002 Adapter will support EM-triggered VNF/VNFC Management	No	SO-2427 - Getting issue details... STATUS

	SOL002 Adapter subscribes and consumes VNF LCM notifications from VNFM	SOL002 Adapter utilizes VNFM exposed SOL002 VNF LCM interface to subscribe LCM Notifications: • SOL002 Adapter subscribes LCM notifications at startup (e.g. listen all notifications) • SOL002 Adapter receives LCM notification and emits VES event to DCAE e.g. for Policy to consume • User should model action Policy to react to these events on ONAP side • Based on modeled action some operation can be done. E.g. with ONAP Controller to configure VNF, clean Close loop etc.	No	SO-2745 - Getting issue details... STATUS
	SOL002 Adapter executes VNF LCM operations towards VNFM	SOL002 Adapter utilizes VNFM exposed SOL002 VNF LCM interface: • ONAP DCAE/Policy executes Close Loop based on VNF or VNFC level events • ONAP Controller or SOL002 Adapter directly can react to Policy trigger as Policy actor to perform LCM operation for VNF • SOL002 Adapter is used to translate LCM action to SOL002 interface format towards external VNFM • External VNFM performs VNF resource changes (VNFC or VNF level)	**No**	
	SOL002 Adapter receives subscription and sends VNF Indicator notifications to VNFM	SOL002 Adapter exposes VNF Indicator subscription endpoint and sends Indicator notifications to external VNFM: • VNFM calls SOL002 Adapter to subscribe VNF Indicator notifications • SOL002 Adapter stores subscriptions according to standard • SOL002 Adapter starts to listen DMaaP events based on subscription • SOL002 Adapter consumes any matching events and translates events to SOL002 Indicator notification and sends to subscriber	**No**	
	Documentation for SOL002 Adapter features	Documentation for SOL002 Adapter features	NO	SO-2431 - Getting issue details... STATUS

SOL002 Adapter Architecture



1. SOL002Adapter will be the SO microservice component
2. SOL002Adapter will be registered in the Microservice Bus (via helm chart)
3. SOL002Adapter will be registered manually in the External System Register
4. SOL002Adapter on startup will use ESR to get external VNFM data
5. SOL002Adapter on startup will register in VNFM for all LCM notifications
6. BPMN will trigger LCM operation which will go to SOL003Adapter
7. SOL003Adapter triggers the LCM flow in VNFM
8. ETSI LCM notification is sent from VNFM and goes to SOL002Adapter
9. SOL002Adapter will query A&AI to get VNF data
10. SOL002Adapter will construct and publish ONAP event via DCAE/DMaaP. At the current phase it will be DMaaP event t but later on it will evolve to VES event.
11. Policy will consume DMaaP event
12. Policy will call configuration component to configure VNF
13. For testing, the VNFM Simulator in the CSIT container will be used

SOL002 Operations

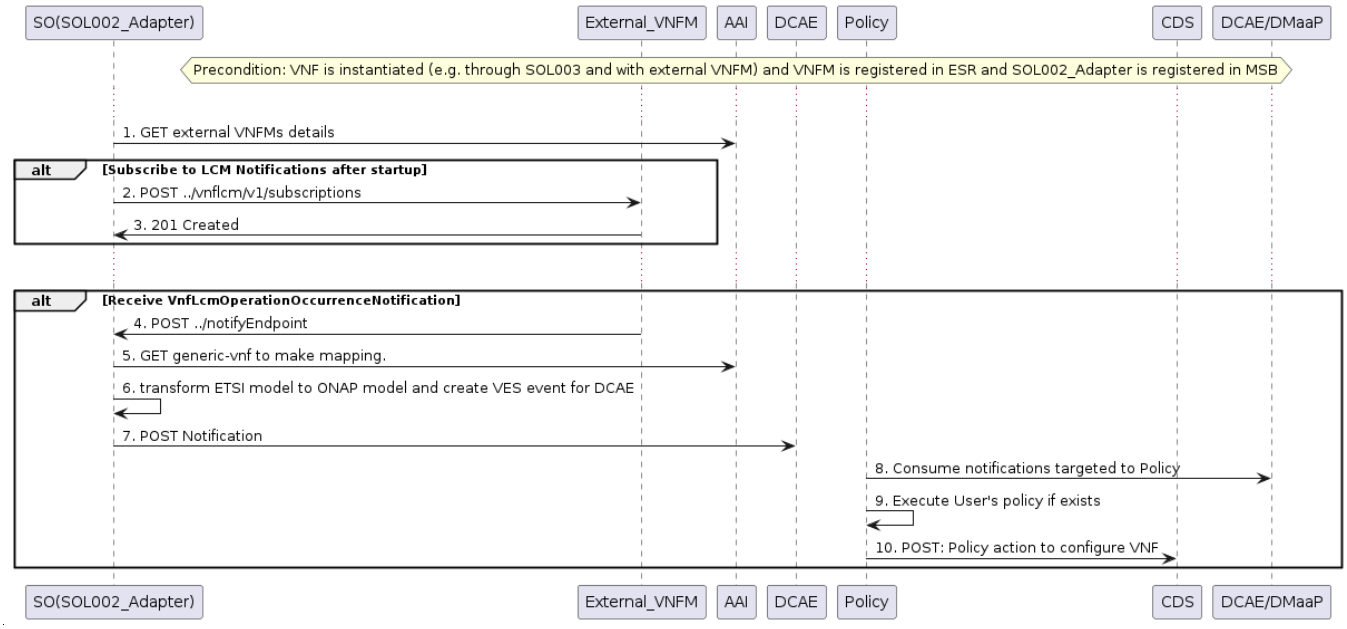
The following SOL002 operations will be supported:

API Action	Actor	Method	URI	Description
Subscribe for LCM notifications	SOL002 Adapter VNFM	POST	`/vnflcm/v1/subscriptions (LccnSubscriptionRequest)`	To create subscription for LCM notification
Notify on VNF lifecycle changes	VNFM SOL002 Adapter	POST	`/lcm/v1/vnf/instances/notifications (VnfLcmOperationOccurrenceNotification)`	To notify SOL002 adapter on VNF lifecycle changes

SOL002 Operation Sequence Flows

VNF LCM (Ve-Vnfm-em)

LCM Notifications



1. SOL002Adapter queries the ESR for external VNFM details.
2. SOL002Adapter subscribes in it's startup notifications from external VNFM. Filter used can be wide i.e. all notifications.
3. When adapter get's success for subscription request it starts to listen notifications. If subscription fails, adapter continues to try again forever with suitable interval.
4. When something happens (e.g. VNF instantiated), external VNFM sends notification
5. Query AAI for VNF details. GET query to MANO may also be needed if vnfIds in systems are not same. **(Optional step, needed if model translation needed)**
6. SOL002Adapter makes necessary translation from ETSI model to ONAP model. **(To be checked: details of translation or if translation even needed - it depends on SOL003 integration)**
7. Agreed VES event (**to be agreed message format and fields**) message format of LCM notification is posted to DCAE
8. Consume LCM notification
9. If Operational Policy reacting to LCM notifications is created as part of normal VNF modeling/instantiation, then user's policy is run. It's up to user's policy what it does and following steps is an example for configuring a VNF with ONAP controller.
10. Execute policy action towards actor (through DMaaP or directly)

Location

SOL002 Adapter continue to be part of SO. Later on it has to be moved to other component (e.g. GNFC).

DMaaP Message Format

Below is a message (the values are sample) sent over to DMaaP.

```
{
  "closedLoopControlName": "ClosedLoopControlName",
  "closedLoopAlarmStart": 1589825445,
  "closedLoopEventClient": "microservice.stringmatcher",
  "closedLoopEventStatus": "ONSET",
  "requestID": "8478ff7d-409d-4b7d-b932-f09ab54765ab",
  "target_type": "VNF",
  "target": "generic-vnf.vnf-id",
  "AAI": {
    "vserver.is-closed-loop-disabled": false,
    "vserver.vserver-name": "<vServerName>",
    "generic-vnf.vnf-id": "<genericId>"
  },
  "from": "ETSI",
  "version": "1.0.2",
  "etsiLcmEvent": {
    "id": "63e446ab-bb42-48aa-ad1f-bf20f6710623",
    "notificationType": "VnfLcmOperationOccurrenceNotification",
    "subscriptionId": null,
    "timeStamp": null,
    "notificationStatus": "RESULT",
    "operationState": "COMPLETED",
    "vnfInstanceId": "2124DEPF",
    "operation": "INSTANTIATE",
    "isAutomaticInvocation": null,
    "vnfLcmOpOccId": "86d3de41-a7f7-48eb-9868-5b103dc36d26",
    "affectedVnfcs": [
      {
        "id": "abc123",
        "vduId": "vdu987",
        "changeType": "ADDED",
        "computeResource": {
          "vimConnectionId": "vim001"
        }
      }
    ],
    "affectedVirtualLinks": null,
    "affectedVirtualStorages": null,
    "changedInfo": null,
    "changedExtConnectivity": null,
    "error": null,
    "_links": {
      "vnfInstance": {
        "href": "https://so-vnfm-simulator.onap:9093/vnflcm/v1/vnf_instances/2124DEPF"
      },
      "subscription": null,
      "vnfLcmOpOcc": {
        "href": "https://so-vnfm-simulator.onap:9093/vnflcm/v1/vnf_lcm_op_occs/86d3de41-a7f7-48eb-9868-
5b103dc36d26"
      }
    }
  }
}
```