



Proposed Extensions to Redfish Common Fabric Model for Initiator/Target Mechanisms

Ver. 1.0
April 2017



Disclaimer

- The information in this presentation represents a snapshot of work in progress within the DMTF.
- This information is subject to change without notice. The standard specifications remain the normative reference for all information.
- For additional information, see the Distributed Management Task Force (DMTF) website.





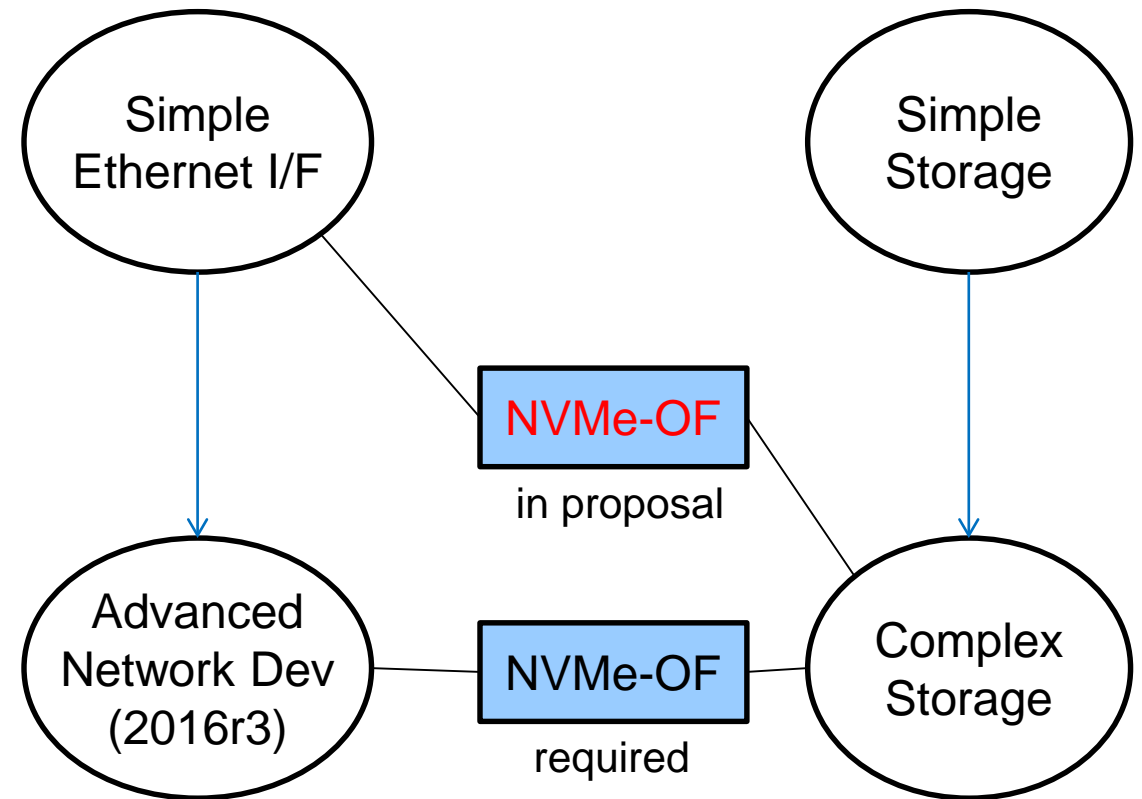
Goal

- Extend existing Common Fabric Model to support management of initiator/target mechanisms (e.g. iSCSI, NVMe-oF)
- SPMF Review Feedback
 - Redfish's network interface and storage models have advanced
 - Proposed extensions to Common Fabric Model only include simple Ethernet Interface
 - Need model of proposal with Advanced Network Device model

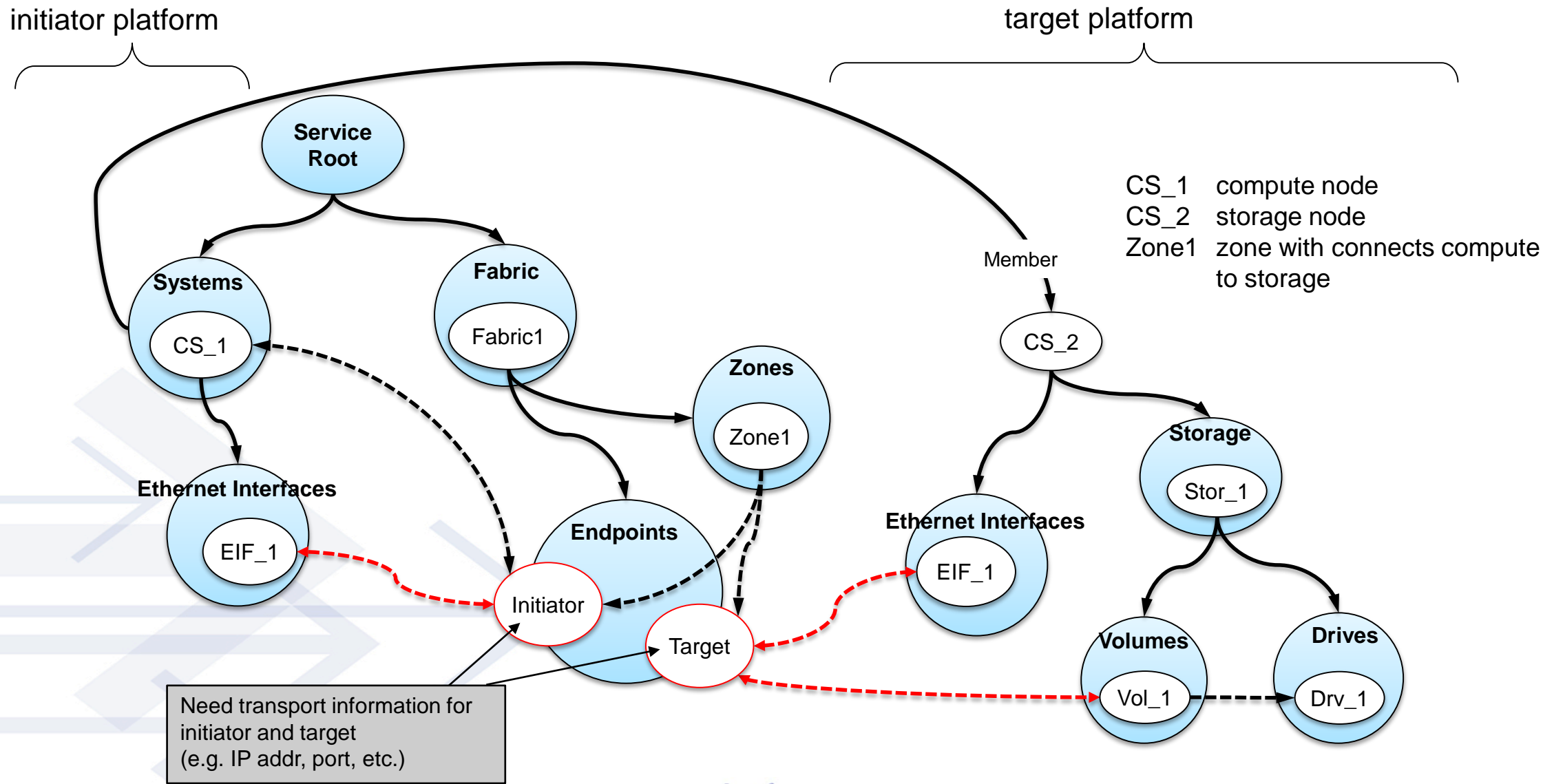


Slides:

1. Review proposal with simple Ethernet I/F model
2. Proposal for Advanced Network Device model
3. Backup: Mockup files



General Initiator/Target Model



iSCSI Initiator/Target Endpoints properties



```
{
  "@odata.context": "/redfish/v1/$metadata#Endpoint.Endpoint",
  "@odata.id": "/redfish/v1/Fabrics/iSCSI/Endpoints/Initiator1",
  "Id": "Initiator1",
  "Name": "iSCSI initiator 1",
  "Description": "iSCSI initiator implemented by the computer system",
  "EndpointProtocol": "iSCSI",
  "Identifiers": [ {
    "DurableName": "host.corp.com:iscsi-subsys-sn-4635",
    "DurableNameFormat": "iQN"
  } ],
  "ConnectedEntities": [ {
    "EntityType": "System",
    "EntityRole": "Initiator",
    "EntityLink": { "@odata.id": "/redfish/v1/Systems/1" }
  } ],
  "Transports": [ {
    "TransportType": "Ethernet",
    "TransportProtocol": "iSCSI",
    "TransportDetails": [ {
      "IpAddress": "10.3.5.131",
      "Port": 13244
    } ]
  } ],
  "Links": {
    "Ports": [
      { "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/1" }
    ]
  }
}
```

```
{
  "@odata.context": "/redfish/v1/$metadata#Endpoint.Endpoint",
  "@odata.id": "/redfish/v1/Fabrics/iSCSI/Endpoints/Target1",
  "Id": "Target1",
  "Name": "iSCSI Target",
  "Description": "iSCSI endpoint for the volume 1 on the SATAEmbedded storage in System 3",
  "EndpointProtocol": "iSCSI",
  "Identifiers": [ {
    "DurableName": "nqn.corp.com:iscsi-subsys-sn-7642",
    "DurableNameFormat": "iQN"
  } ],
  "ConnectedEntities": [ {
    "EntityType": "Volume",
    "EntityRole": "Target",
    "EntityAccessMode": "Read",
    "EntityLink": { "@odata.id": "/redfish/v1/Systems/3/Storage/SATAEmbedded/Volume/1" }
  } ],
  "Transports": [ {
    "TransportType": "Ethernet",
    "TransportProtocol": "iSCSI",
    "TransportDetails": [ {
      "IpAddress": "10.3.5.132",
      "Port": 13244
    } ]
  } ],
  "Links": {
    "Ports": [
      { "@odata.id": "/redfish/v1/Systems/3/EthernetInterfaces/1" }
    ]
  }
}
```



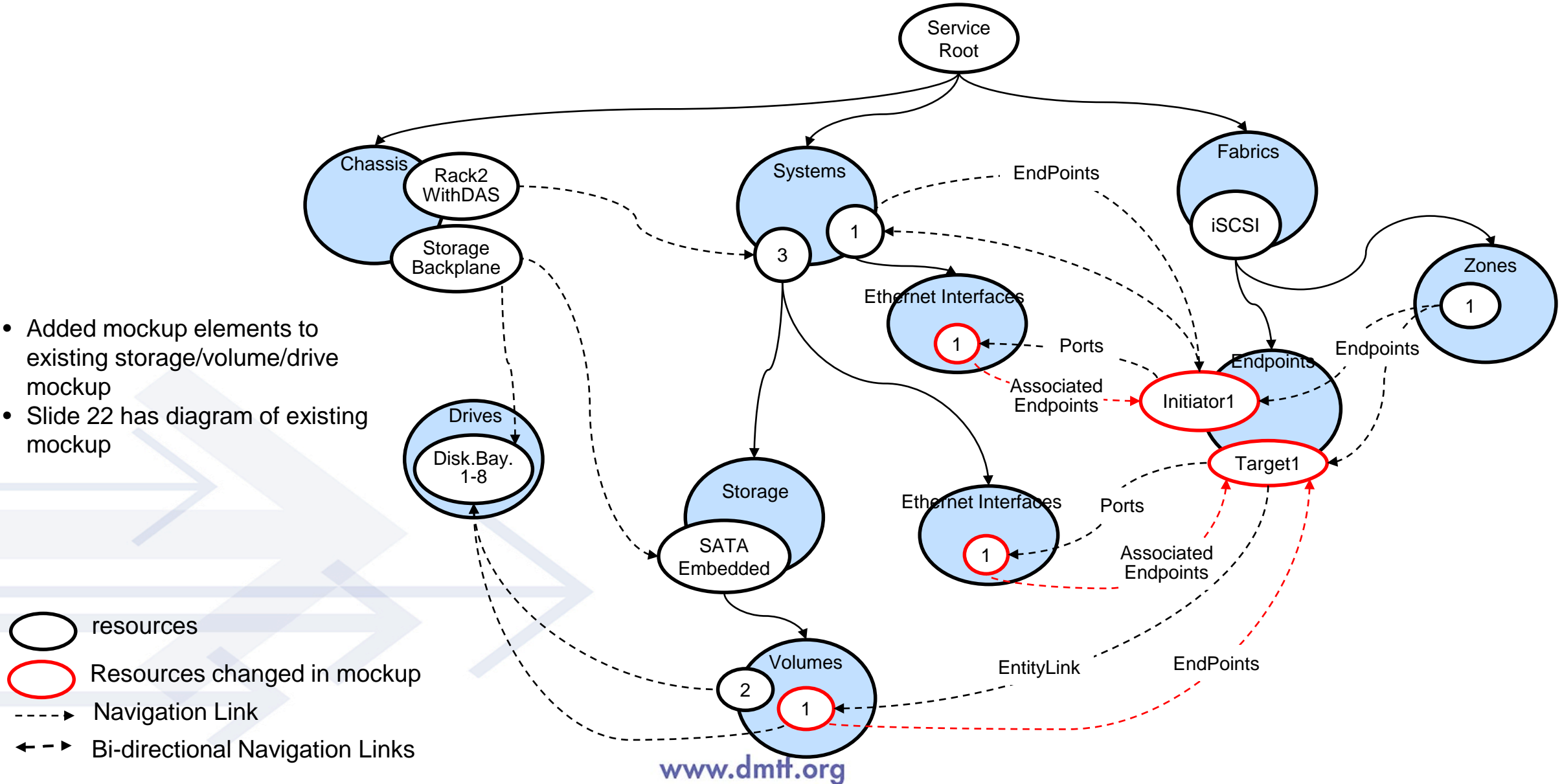
Schema Changes

Metadata	Description
Endpoint_v1.xml	Add Transports array property Add EndpointTransport complex type Add UUID property to identify the endpoint Add EntityAccessMode property to ConnectedEntity complex type
EthernetInterface_v1.xml	Add Links.AssociatedEndpoints array property
Resource_v1.xml	Append DurableNameFormat enum with NQN (NVMe Qualified Name) and NSID (NVMe Namespace Identifier)
Volume_v1.xml	Add "Links.Endpoints" array property
Zone_v1.xml	Add UUID property to identify fabric zone - to support addressable fabrics like Ethernet

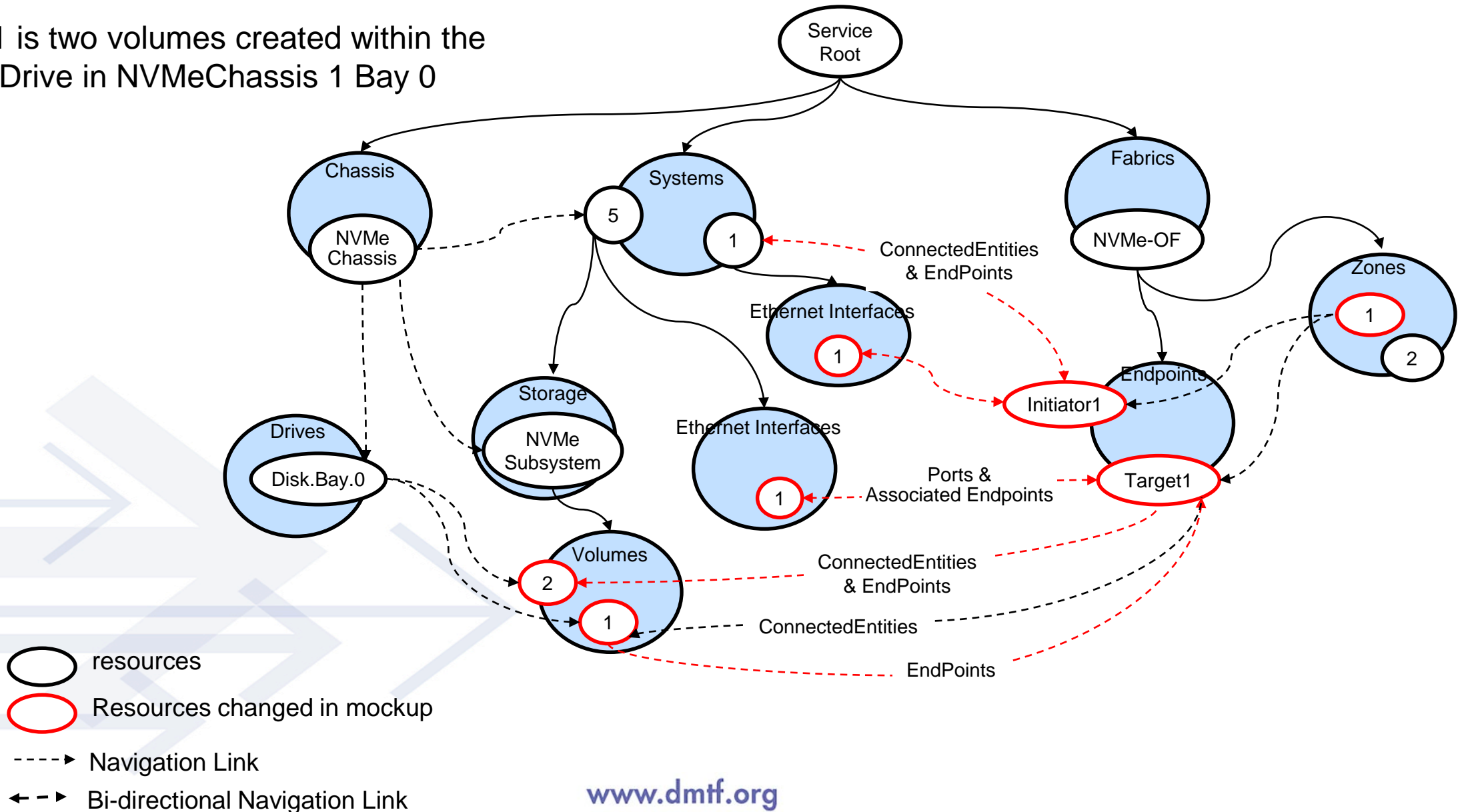
iSCSI Fabric Mockup



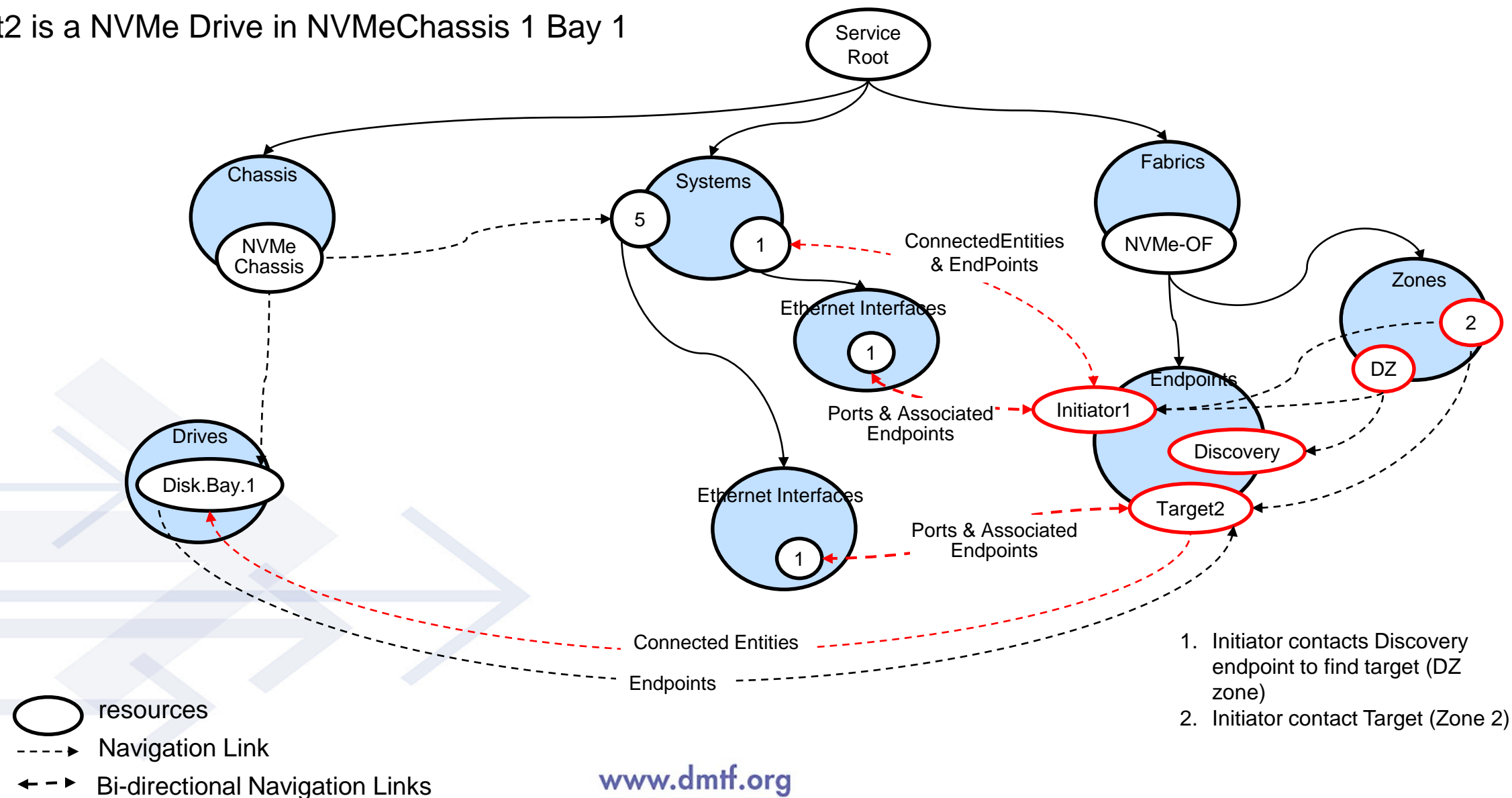
- Added mockup elements to existing storage/volume/drive mockup
- Slide 22 has diagram of existing mockup



Target1 is two volumes created within the NVMe Drive in NVMeChassis 1 Bay 0



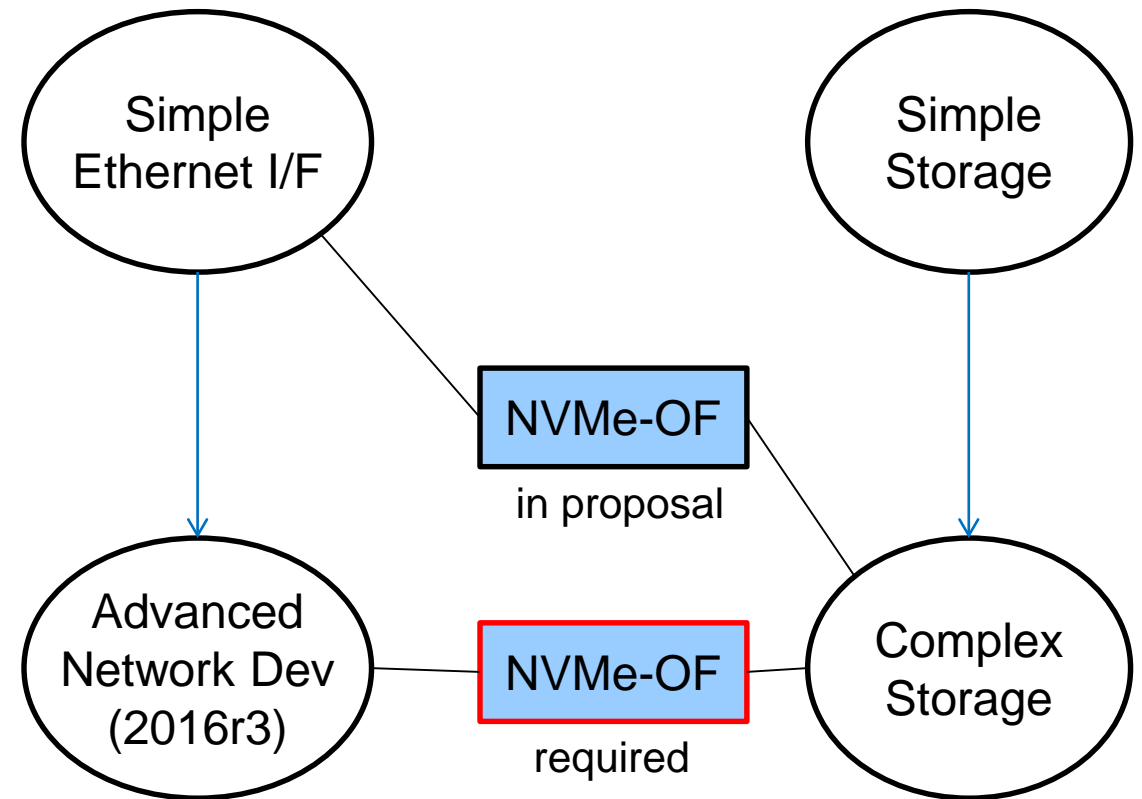
Target2 is a NVMe Drive in NVMeChassis 1 Bay 1





Slides:

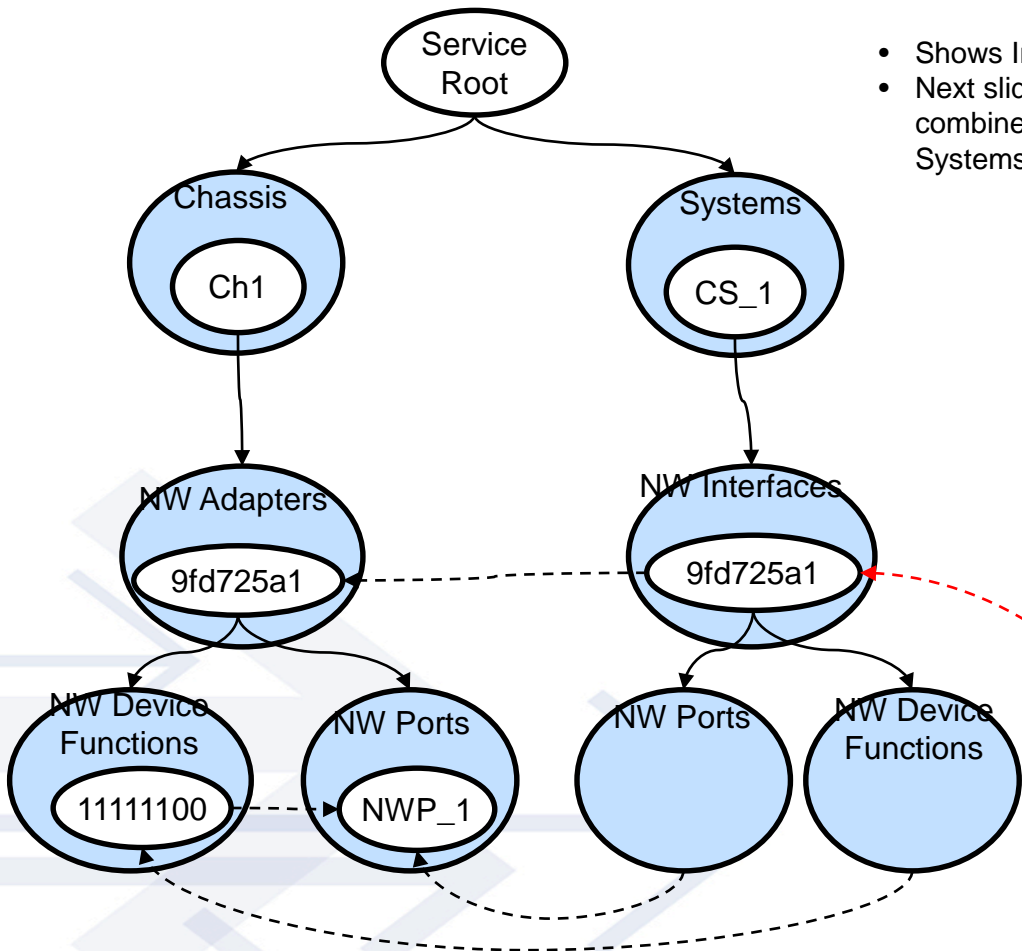
1. Review proposal with simple Ethernet I/F model
2. Proposal for Advanced Network Device model
3. Backup: Mockup files





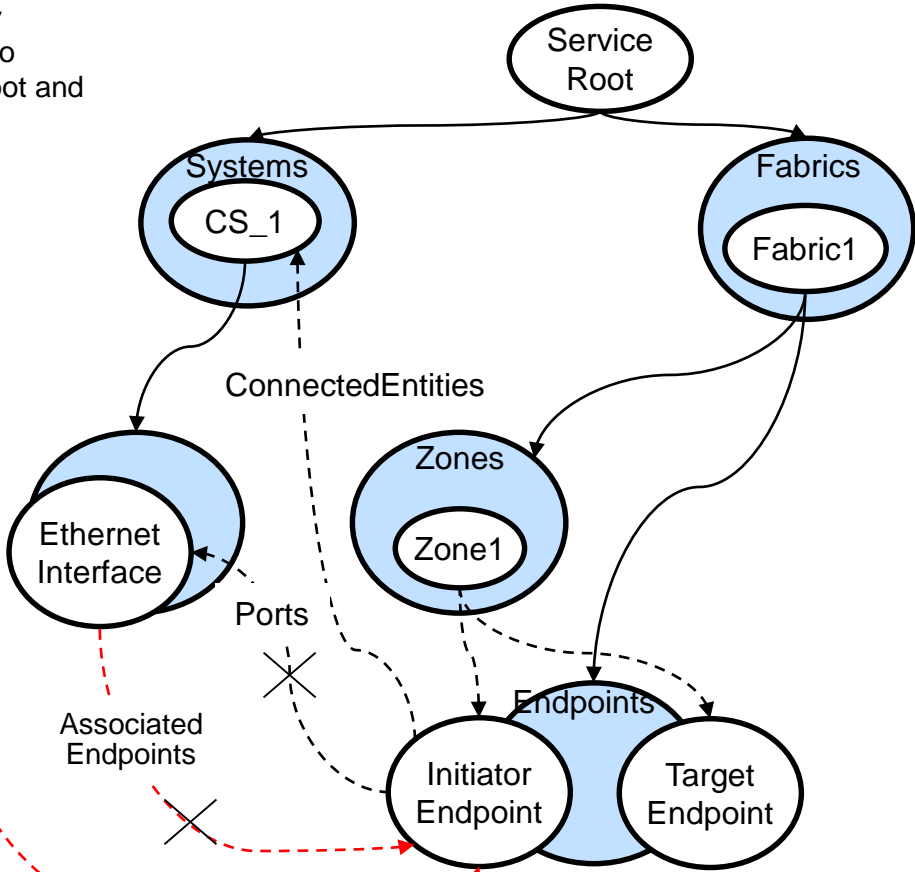
Initiator Side

ACD mockup



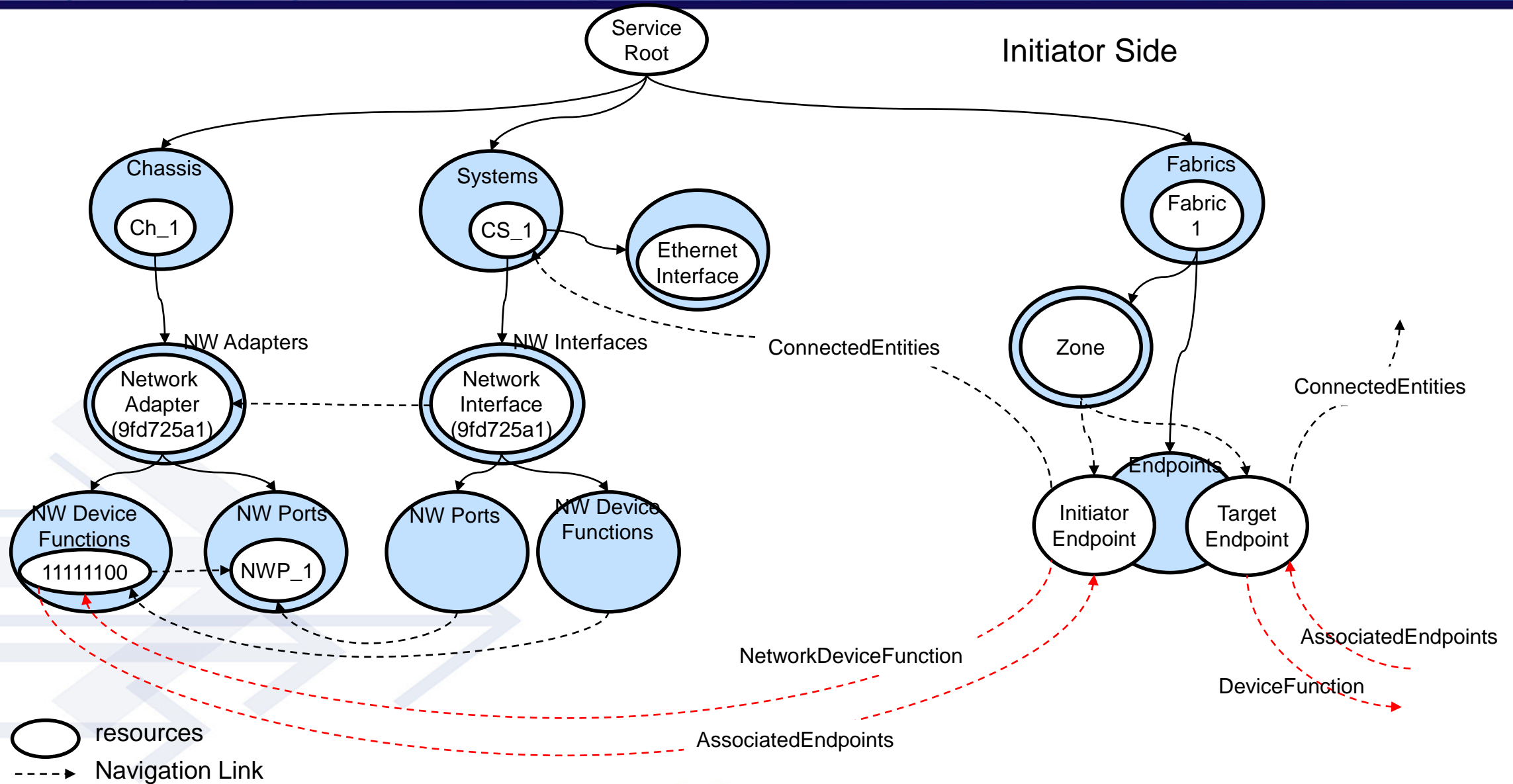
- Shows Initiator only
- Next slide, redraw to combine ServiceRoot and Systems

NVMe-OF



- resources
- - - - - Navigation Link
- subordinate

Proposed model





Changes

- In Endpoint resource
 - Add Links.NetworkDeviceFunction
- In NetworkDeviceFunction resource
 - Add Links.AssociatedEndpoints
 - Add RDMA properties

```
"Transports": [ {  
  "Description": "RDMA transport details of the Target 1 Endpoint",  
  "TransportType": "Ethernet",  
  "TransportProtocol": "RDMA",  
  "TransportDetails": [ {  
    "RDMAType": "RoCEv2",  
    "IpAddress": "10.3.5.132",  
    "Port": 13244  
  }]  
}]
```



```
{
  "@Redfish.Copyright": "Copyright 2014-2016 Distributed Management Task Force, Inc. (DMTF). All rights reserved.",
  "@odata.context": "/redfish/v1/$metadata#NetworkDeviceFunction.NetworkDeviceFunction",
  "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/9fd725a1/NetworkDeviceFunctions/111111111100",
  "@odata.type": "#NetworkDeviceFunction.v1_0_0.NetworkDeviceFunction",
  "Id": "111111111100",
  "Name": "Network Device Function View",
  "NetDevFuncType": "Ethernet",
  "DeviceEnabled": true,
  "NetDevFuncCapabilities": [
    "Ethernet", "FibreChannel"
  ],
  "Ethernet": {
    "PermanentMACAddress": "00:0C:29:9A:98:ED",
    "MACAddress": "00:0C:29:9A:98:ED",
    "MTUSize": 1500
  },
  "iSCSIBoot": {
    "IPAddressType": "IPv4",
    "InitiatorIPAddress": "16.0.11.6",
    "InitiatorName": "iqn.2005-03.com.acme:database-server",
    "InitiatorDefaultGateway": "169.0.16.1",
    "InitiatorNetmask": "255.255.252.0",
    "TargetInfoViaDHCP": false,
    "PrimaryTargetName": "iqn.2005-03.com.acme:image-server",
    "PrimaryTargetIPAddress": "169.0.15.1",
    "PrimaryTargetTCPPort": 3260,
  }
}
```




./Chassis/1/NetworkAdapters/{id}/NetworkDeviceFunctions/{id}

```
{
  "@odata.context": "/redfish/v1/$metadata#NetworkDeviceFunction.NetworkDeviceFunction",
  "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/9fd725a1/NetworkDeviceFunctions/111111111100",
  "@odata.type": "#NetworkDeviceFunction.v1_0_0.NetworkDeviceFunction",
  "Id": "111111111100",
  "Name": "Network Device Function View",
  "NetDevFuncType": "Ethernet",
  "DeviceEnabled": true,
  "NetDevFuncCapabilities": [ "Ethernet", "FibreChannel" ],
  "Ethernet": {
    "PermanentMACAddress": "00:0C:29:9A:98:ED",
    "MACAddress": "00:0C:29:9A:98:ED",
    "MTUSize": 1500
  },
  "iSCSIBoot": {
  },
  "FibreChannel": {
  },
  "AssignablePhysicalPorts": [ { "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/9fd725a1/NetworkPorts/1" } ],
  "PhysicalPortAssignment": { "@odata.id": "/redfish/v1/Chassis/1/NetworkAdapters/9fd725a1/NetworkPorts/1" },
  "Links": {
    "PCleFunction": { "@odata.id": "/redfish/v1/Chassis/1/PCleDevices/NIC/Functions/1" }
  }
}
```



Mockup files

(Simple Ethernet Interface)



```
{
  "@odata.context": "/redfish/v1/$metadata#Endpoint.Endpoint",
  "@odata.type": "#Endpoint.v1_0_0.Endpoint",
  "@odata.id": "/redfish/v1/Fabrics/NVMe-oF/Endpoints/Initiator1",
  "Id": "Initiator1",
  "Name": "NVMe-oF initiator 1",
  "Description": "NVMe-oF initiator implemented by the computer system",
  "EndpointProtocol": "NVMeOverFabrics",
  "Identifiers": [ {
    "DurableName": "host.corp.com:nvme:nvm-subsys-sn-4635",
    "DurableNameFormat": "NQN"
  } ],
  "ConnectedEntities": [ {
    "EntityType": "System",
    "EntityRole": "Initiator",
    "EntityLink": { "@odata.id": "/redfish/v1/Systems/1" }
  } ],
  "Transports": [ {
    "TransportType": "Ethernet",
    "TransportProtocol": "RDMA",
    "TransportDetails": [ {
      "RDMAType": "RoCEv2",
      "IpAddress": "10.3.5.131",
      "Port": 13244
    } ]
  } ],
  "Links": {
    "Ports": [ { "@odata.id": "/redfish/v1/Systems/1/EthernetInterfaces/1" } ]
  }
}
```

NetworkDeviceFunctions array in Links

Use case?: need to find the network which supports RDMA



```
{
  "@odata.context": "/redfish/v1/$metadata#Endpoint.Endpoint",
  "@odata.id": "/redfish/v1/Fabrics/NVMe-oF/Endpoints/Target1",
  "@odata.type": "#Endpoint.v1_0_0.Endpoint",
  "Id": "Target1",
  "Name": "NVMe Drive 1 Volumes",
  "Description": "Two volumes created within the NVMe Drive in NVMeChassis 1 Bay 0",
  "EndpointProtocol": "NVMeOverFabrics",
  "Identifiers": [ {
    "DurableName": "nqn.corp.com:nvme:nvm-subsys-sn-7642",
    "DurableNameFormat": "NQN"
  } ],
  "ConnectedEntities": [
    {
      "EntityType": "Volume",
      "EntityRole": "Target",
      "EntityAccessMode": "Read",
      "EntityLink": { "@odata.id": "/redfish/v1/Systems/5/Storage/NVMeSubsystem/Volume/1" }
    }, {
      "EntityType": "Volume",
      "EntityRole": "Target",
      "EntityAccessMode": "ReadWrite",
      "EntityLink": { "@odata.id": "/redfish/v1/Systems/5/Storage/NVMeSubsystem/Volume/2" },
    }
  ],
  "Transports": [
    ...
  ],
  "Links": {
    "Ports": [ { "@odata.id": "/redfish/v1/Systems/5/EthernetInterfaces/1" } ]
  }
}
```

```
"Transports": [ {
  "Description": "RDMA transport details of the Target 1 Endpoint",
  "TransportType": "Ethernet",
  "TransportProtocol": "RDMA",
  "TransportDetails": [ {
    "RDMAType": "RoCEv2",
    "IpAddress": "10.3.5.132",
    "Port": 13244
  } ]
}]
```

NVMe-oF DiscoveryService Endpoint



```
{
  "@odata.context": "/redfish/v1/$metadata#Endpoint.Endpoint",
  "@odata.id": "/redfish/v1/Fabrics/NVMe-oF/Endpoints/DiscoveryService",
  "@odata.type": "#Endpoint.v1_0_0.Endpoint",
  "Id": "DiscoveryService",
  "Name": "Discovery Service",
  "Description": "The Discovery Service for NVMe-oF 1 fabric",
  "EndpointProtocol": "NVMeOverFabrics",
  "Identifiers": [ {
    "DurableName": "discovery.corp.com:nvme:nvm-subsys-sn-1932",
    "DurableNameFormat": "NQN"
  } ],
  "ConnectedEntities": [ {
    "EntityType": "Service",
    "EntityRole": "Both",
    "EntityLink": {}
  } ],
  "Transport": [ {
    "Description": "RDMA transport details of the Discovery Service Endpoint",
    "TransportType": "Ethernet",
    "TransportProtocol": "RDMA",
    "TransportDetails": [ {
      "RDMAType": "RoCEv2",
      "IpAddress": "10.3.5.130",
      "Port": 13244
    } ]
  } ]
}
```



```
{
  "@odata.id": "/redfish/v1/Fabrics/NVM-oF",
  "FabricType": "NVMeOverFabrics",
  "Status": {
    "State": "Enabled",
    "Health": "OK"
  },
  "Zones": {
    "@odata.id": "/redfish/v1/Fabrics/NVM-oF/Zones"
  },
  "Endpoints": {
    "@odata.id": "/redfish/v1/Fabrics/NVM-oF/Endpoints"
  }
}
```



```
{
  "@odata.id": "/redfish/v1/Fabrics/NVM-oF/Zones/1",
  "Status": {
    "State": "Enabled",
    "Health": "OK"
  },
  "Links": {
    "Endpoints": [
      {
        "@odata.id": "/redfish/v1/Fabrics/NVM-oF/Endpoints/Init1"
      },
      {
        "@odata.id": "/redfish/v1/Fabrics/NVM-oF/Endpoints/Tgt1"
      }
    ]
  }
}
```




iSCSI Storage Mockup

Existing storage/volume/drive mockup
./mockups/development

