



Logical Memory Region Data Model Proposal

Ver. 0.5
July 28, 2021

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.

Problem

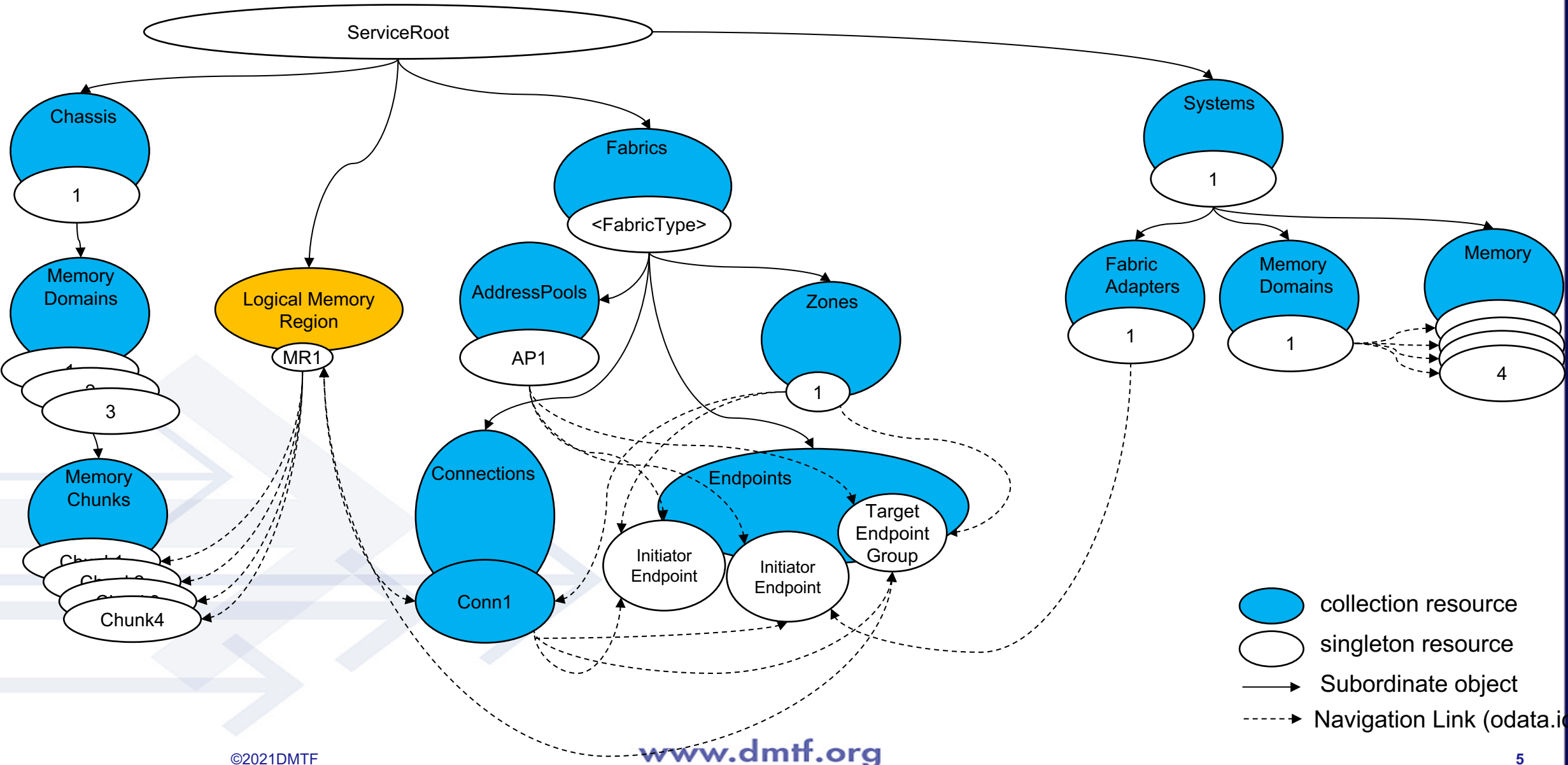
- Today Connections contains connection information and storage volume information
 - Endpoints/EndpointGroups
 - VolumeInfo with Navigation Pointer to Volume(s)
- Gen-Z has the concept of an interleaved logical memory object based on Fabric Attached Memory
 - Interleave table is used by the initiator(s)
 - Interleaved across specific MemoryChunks on *different* target endpoints
- Today, we do not have a logical 'memory' object to which we can attach interleave details
 - Details are needed to fill out the interleave table
- Could enhance MemoryInfo within Connections to add Interleave Info, *however*:
 - This relationship between MemoryChunks would be lost when the connection is removed
 - If MemoryChunks are on persistent media, data would be lost when connection is removed
 - This relationship between MemoryChunks may be defined long before 'connections' are requested



Proposal

- Option 1: Enhance Volume definition to include memory chunks and interleave capabilities
 - Volume is very storage specific
 - Use “VolumeInfo” in the connection for logical ‘memory’ volumes
 - Volume is currently a subordinate object of Storage, how would this work for logical memory volumes?
- Option 2: Create a different “LogicalMemoryRegion” that is memory specific
 - Focused on Interleaved memory
 - Make Logical Memory Region a subordinate of the service root
- Prefer option 2 to separate storage volumes and memory regions
 - Memory may be volatile or persistent
 - Memory is byte addressable

Logical Memory Region with interleaved chunks



Logical Memory Region

- New Object
 - Standard object requirements
 - LMR specifics?
 - Persistence type utilized
 - Total size of region
 - Other memory attributes like ECC?
 - List of physical resources
 - Array of URIs to Memory Chunks
 - Order of URIs *not important*
 - Optional other memory resources as targets
- ```
{
 "@odata.id": "/redfish/v1/LogicalMemoryRegions/1",
 "@odata.type": "#LogicalMemoryRegion.v0_5_0.LogicalMemoryRegion",
 "@Redfish.Copyright": "Copyright 2014-2021 DMTF. For the full DMTF
copyright policy, see http://www.dmtf.org/about/policies/copyright.",
 "Id": "1",
 "Name": "LogicalMemoryRegion 1",
 "Description": "Logical Memory Region 1",
 "Status": {
 "State": "Enabled",
 "Health": "OK"
 }
 "TargetResources": [
 { "@odata.id":
"/redfish/v1/chassis/GenZ/MemoryDomain/1/MemoryChunks/1" },
 { "@odata.id":
"/redfish/v1/chassis/GenZ/MemoryDomain/1/MemoryChunks/2" },
 { "@odata.id":
"/redfish/v1/chassis/GenZ/MemoryDomain/2/MemoryChunks/1" },
 { "@odata.id":
"/redfish/v1/chassis/GenZ/MemoryDomain/2/MemoryChunks/2" }
],
 "TotalRegionSizeInMiB": 256000,
```



## Logical Memory Region

- Structure that describes the logical resource relationship
- RelationshipType:
  - Block:
    - Entire contiguous region of resource 1 used before starting on entire region of resource 2, etc
  - Interleaved
    - Interleave 'stripe size'
    - Number of 'ways'
    - Method to map addresses to 'ways'
    - WayMap, Maps 'ways' to 'resources'
      - *order is important\**

- "RelationshipType": "Interleaved | Block",
- "InterleaveDetails": {
- "StripeSizeInBytes": 256,
- "InterleaveType": "6-way",
- "WayDecodeMethod": "NxM",
- "WayMap": [
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/1/MemoryChunks/1" },
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/2/MemoryChunks/1" },
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/1/MemoryChunks/2" },
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/2/MemoryChunks/2" },
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/1/MemoryChunks/1" },
- { "@odata.id":  
"/redfish/v1/chassis/GenZ/MemoryDomain/2/MemoryChunks/2" }
- ]
- },
-



## Logical Memory Region

- Navigation Link to EndpointGroup
  - Single Endpoint for LMR made from single resource, single EndPoint?
- Array of NavLink(s) back to connections associated with this LogicalResource

```
• "Links": {
• "EndpointGroups": {
• { "@odata.id": "/redfish/v1/Fabrics/GenZ/EndpointGroups/1" }
• },
• "Connections": [
• { "@odata.id": "/redfish/v1/Fabrics/GenZ/Connections/24" }
•],
• "Oem": {}
• }
```



## Connection

- MemoryInfo Contains LogicalMemoryRegion
  - Connection is between an Initiator Endpoint/EndpointGroup and
  - LogicalMemoryVolume
  - TargetEndpointGroup points to same EndpointGroup defined in LogicalMemoryRegion

```
• {
• "@odata.id": "/redfish/v1/Fabrics/GenZ/Connections/40",
• "@odata.type": "#Connection.v1_0_0.Connection",
• "Description": "Gen-Z Connection 40 Information",
• "Id": "40",
• "Name": "Connection 40",
• "ConnectionType": "Memory",

• "MemoryInfo": [
• { "AccessCapabilities": [
• "Read",
• "Write"
•]
• },
• "LogicalMemoryRegion" : {
• "@odata.id": "/redfish/v1/LogicalMemoryRegion/1" }
•],

•
• },
• "Links": {
• "InitiatorEndpointGroups": [
• { "@odata.id": "/redfish/v1/Fabric/GenZ/EndpointGroups/1" }
•],
• "TargetEndpointGroups": [
• { "@odata.id": "/redfish/v1/Fabric/GenZ/EndpointGroups/2" }
•],
• }
```