



LFN Developer & Testing Forum

ODIM Use Cases for ONAP

Joseprabu (Jose) Inbaraj - TSC Member

@jpinbaraj

- ODIM Intro
 - Current Members
 - Earlier ODIM Sessions
 - What is ODIM trying to solve?
 - ODIM Goals & Benefits
- ODIM Use Cases for ONAP
 - End-to-End Visibility
 - Bare Metal Composability of NFVI
 - Aggregated manageability of Multivendor Devices (including PNFs)
- Call For Action
 - ODIM Contribution Areas
 - Links for Participation

ODIM Intro

Open Distributed Infrastructure Management (ODIM)

A bold collaborative open source initiative to bring together a critical mass of infrastructure management and orchestration stakeholders to define and execute the collaborative work in several areas.

[Explore ODIM Wiki](#)

[Join Mailing List](#)

[See Repos](#)

A Linux Foundation Project
Part of LF Networking (pending)

Formed in July 2020
First release – January 2021



ODIM Community

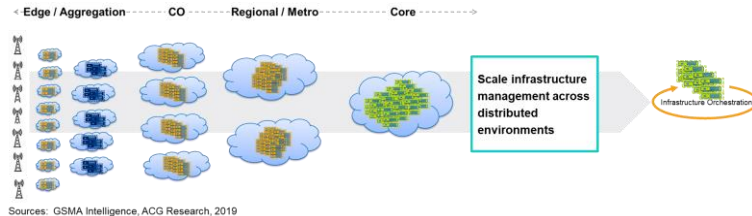


Earlier ODIM Sessions

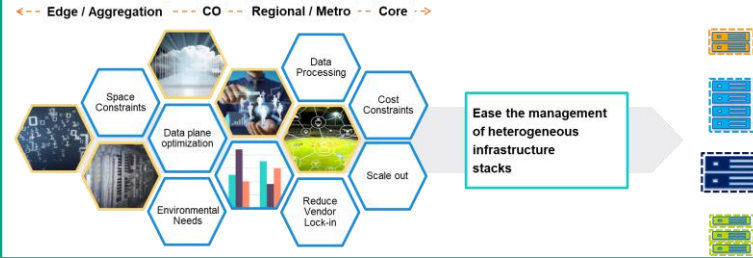
- [ODIM Introduction](#)
 - Check this out for high level overview of ODIM from Alex Vul (Intel)
 - <https://wiki.lfnetworking.org/display/LN/2021-02-02+-+ODIM%3A+Introduction>
- [ODIM Release 1](#)
 - Learn more in detail about ODIM and its first release from Jonas Arndt (HPE) and Susan Bowen (HPE)
 - [2021-02-03 - ODIM: Release 1 - LF Networking - Confluence](#)
- [ODIM Build & Run](#)
 - View this to learn how to build, deploy and use ODIM from Bharath Kumar (HPE) and Muthukkumaran (Muthu) Ramalingam (AMI)
 - This session also covers a demo of a COTS solution using the deployed ODIM for infrastructure management – showcasing the stability of ODIM code
 - [2021-02-03 - ODIM: Build & Run - LF Networking - Confluence](#)

Infrastructure Mgmt. Challenges

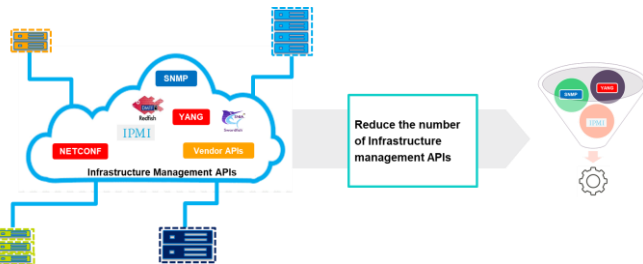
Increasing numbers of distributed data centers as Telcos move to the Edge



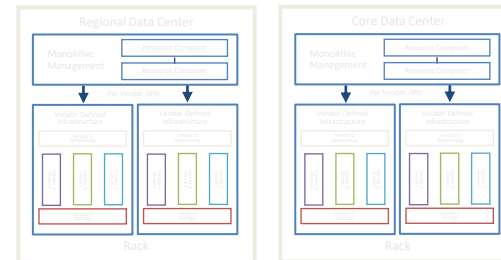
Increasing numbers of multivendor heterogeneous platforms as vendors compete



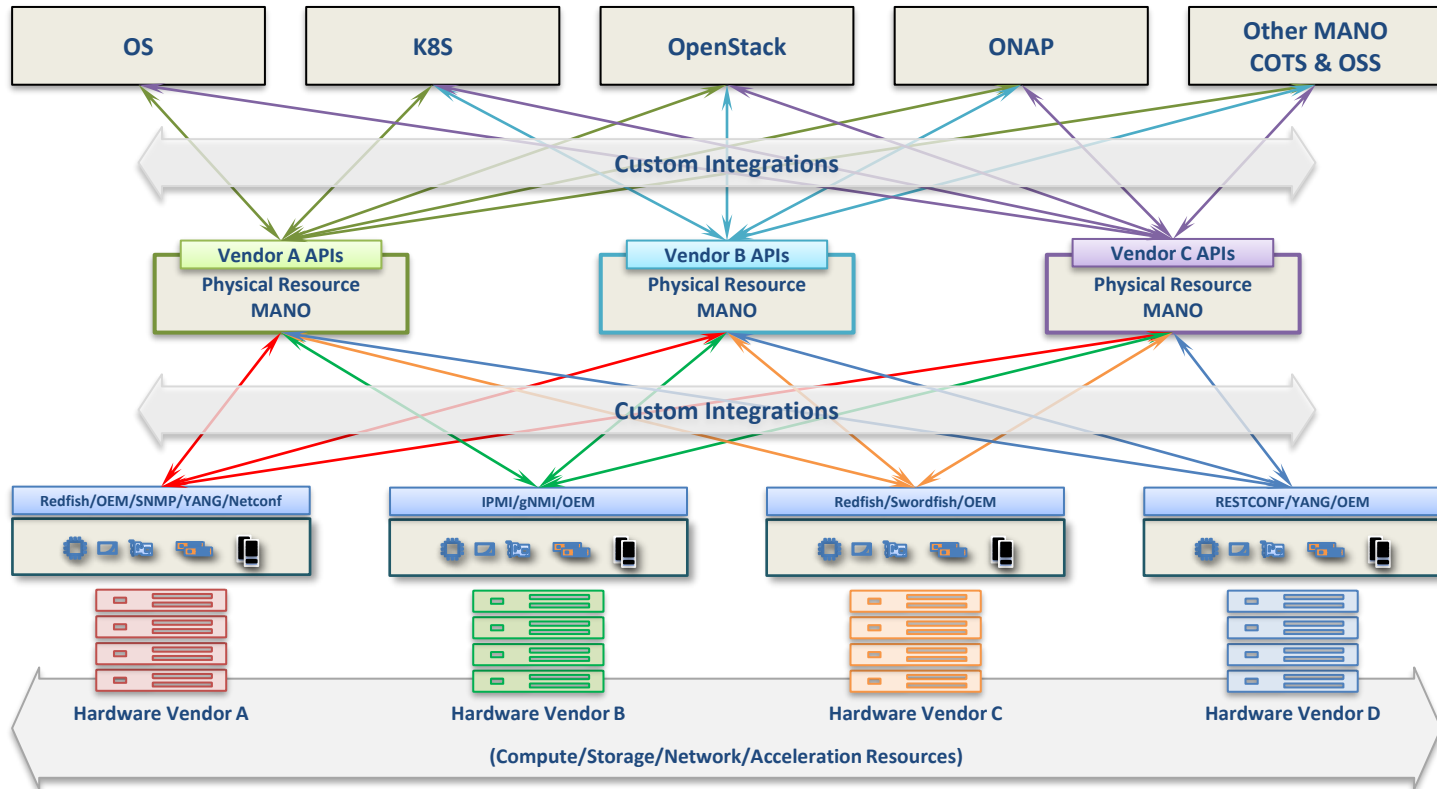
Need for alignment across compute, storage, networking and vendor implementations



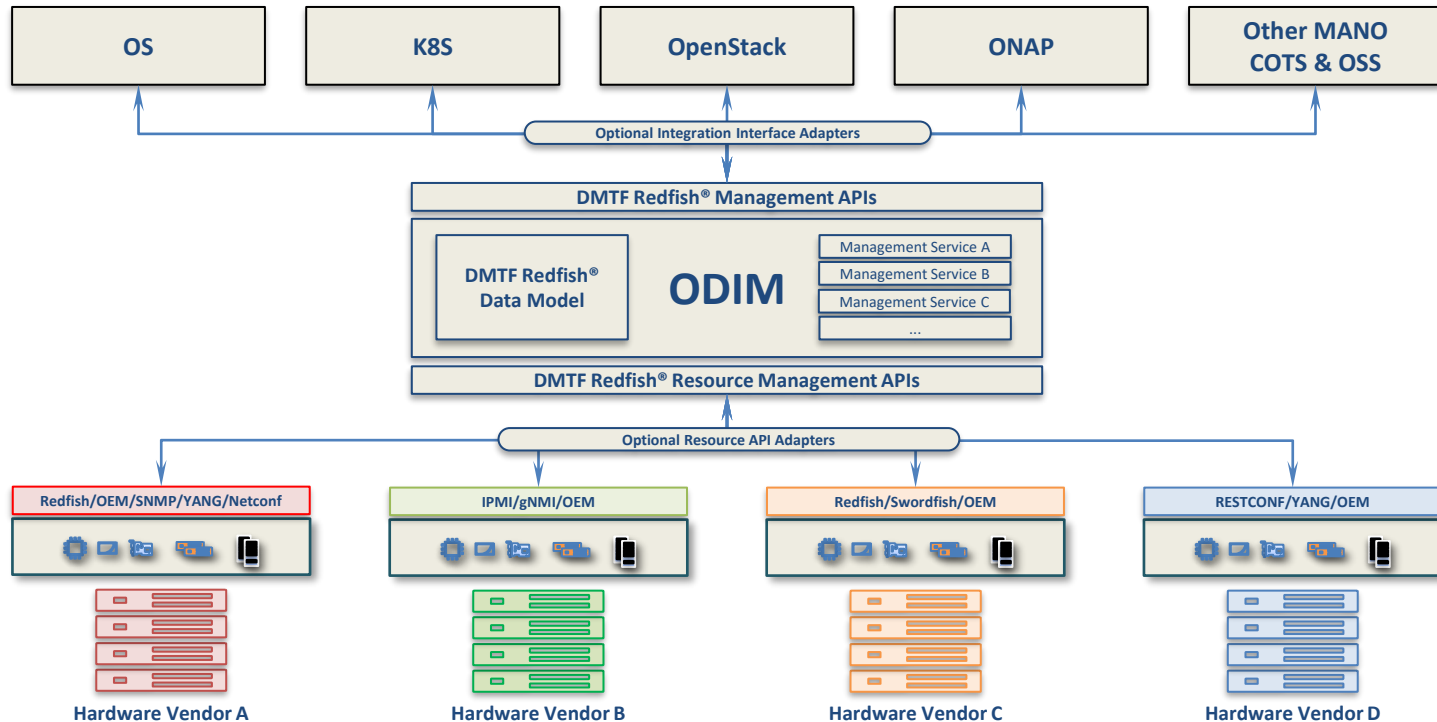
Need to manage Legacy solutions



Today's Physical Resource Management Sprawl



ODIM Simplifies Physical Resource Management...



ODIM Goals & Benefits

GOALS

Create an ecosystem of hardware platform management and MANO plug-ins/adapters

Facilitate integration with upstream MANO solutions

Enable management API interoperability between vendors of distributed, heterogeneous physical infrastructure

Deliver a reference implementation of DMTF Redfish® APIs

Enable wide adoption across Enterprise, Telecom, Cloud and other markets

BENEFITS

Abstraction/Translation – Clients don't see differences in vendors' Redfish implementation or management protocols

Aggregation – ODIM aggregates all resources across the datacenter. No knowledge of IP addresses or credentials needed. It also allows operations on aggregated resources

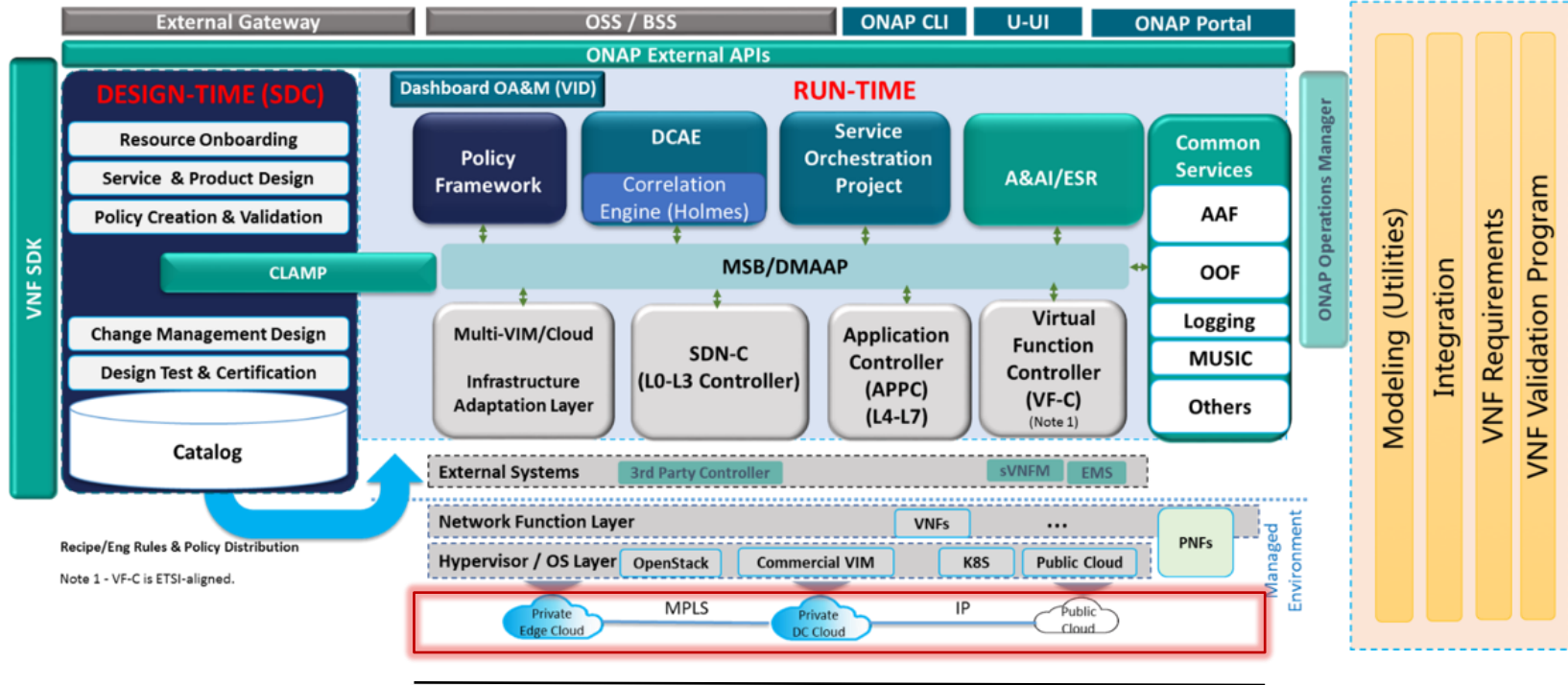
Proxy – ODIM can be multihomed so clients don't need to be on the management network. Enables centralization of higher-level functions

ODIM Use Cases for ONAP

ONAP + ODIM

End-to-End Visibility
Bare Metal Composability
Aggregated Manageability
Of Multivendor Infrastructure

ODIM and ONAP



ODIM (For Infrastructure Mgmt.)

End-to-End Visibility

- vCPE
 - End customers expect newer and innovative solutions more frequently
 - Communication Service Providers' (CoSPs) success depends on their ability to deploy new services rapidly and efficiently
 - NERG (Network Enhanced Residential Gateway) solves this by moving core functionality of the residential gateway to the edge/cloud so that services can be dynamically added or removed
 - **Barrier to NERG adoption is lack of end-to-end visibility**
 - Create ODIM Resource Adapters to get one unified and standards-based interface to discover, manage and get complete visibility of h/w where vCPEs gets deployed
- Edge Cloud
 - 5Gs promise of wider, faster and more reliable bandwidth through Edge Cloud is enabling many industries to invent newer solutions and services
 - Such solutions and services place different type of resource requirements on the underlying infrastructure
 - To deliver such solutions efficiently, vendors need to have complete visibility of all types of resources (Compute / Storage / Fabric / Acceleration) deployed across geographical boundaries
 - **Key challenge is in get visibility of such wide variety of resources from multiple vendors supporting various management APIs**
 - Add ODIM Resource Adapters to handle non-compliant hardware and use one unified and standards-based management API to get visibility of all types of resources

Bare Metal Cloud - Benefits

- Virtualized environments offer the best combination of cost efficiency and agility
 - But they also add one additional layer of attack surface
 - Compromising this layer could allow attacks to bleed into one or more virtual machines
- Bare Metal Cloud provides an option to deploy your solutions through bare metal infrastructure
 - Enables higher levels of performance and security
 - Squeeze the maximum value out of the infrastructure
 - Helps in "lift-and-shift" scenarios (VNFs/CNFs)
- Bare Metal Use cases
 - Important for new applications in 3D imaging, artificial intelligence and machine learning as they are very resource intensive
 - Ideal in Edge computing situations where infrastructure and applications need to be placed closer to where data is generated and consumed

Bare Metal Cloud - Adoption

- Global bare-metal cloud market is expected to grow from \$1.5 billion in 2017 to \$7.7 billion by 2023 – a compound annual growth rate of 31 percent
 - [Bare Metal Cloud Market Report - Global Industry Forecast To 2023 \(marketresearchfuture.com\)](https://www.marketresearchfuture.com)
- Equinix, the world's largest colocation provider, paid \$335 million for Packet, a company that specialized in fast, automated delivery of bare-metal infrastructure
 - [Equinix's \\$335M Packet Acquisition Is Closed. Here's What's Next \(datacenterknowledge.com\)](https://www.datacenterknowledge.com)
- Platform9 announced what it billed as the first cloud-ready, fully managed bare metal solution, allowing data centers to transform their physical servers into bare-metal clouds
- Google Cloud has been taking its bare-metal offerings global

Dynamic Composition of NFV Infrastructures

Build 'Application Defined Dynamic Servers' with exact type and amount of resources needed by VNFs/CNFs

1. Search for resources with specific characteristic (CPU cores, memory, disk size, NIC)
2. Select server, setup boot path and pick Fabric endpoint
3. Compose the server
4. Use ODIM Resource Aggregator's Fabric API to create network connectivity between endpoints in two different domains
5. Launch the Composed Server
6. Reset the server
7. Watch it boot
8. Provision VNFs or SDWAN Services

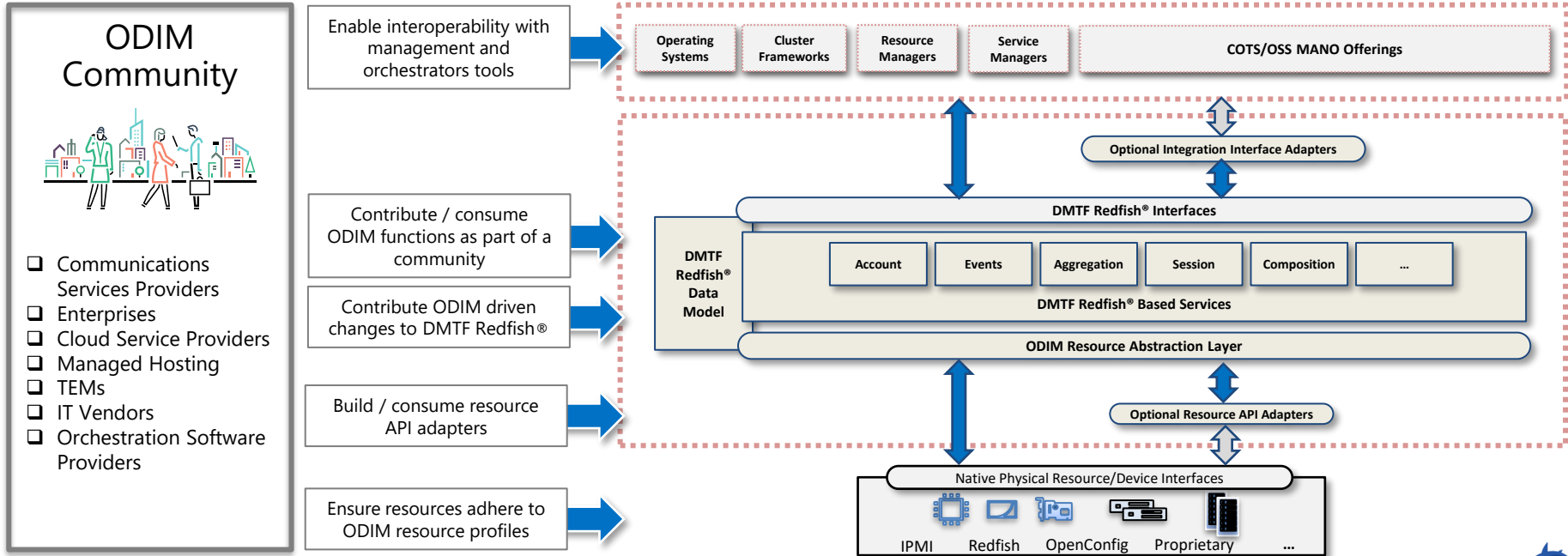
Aggregated PNF Management

- PNF – Physical Network Function
 - A physical network node which has not undergone virtualization (as VNF or CNF)
 - Example: 5G Base Stations, Legacy Network Device, etc.
- Standards based Aggregated Manageability for PNF devices
 - One of the key challenges is that there are several devices that do not support a standardized way for remote management
 - Legacy PNF devices may depend on CLI and few other may implement custom interfaces
 - Modern PNF devices could still rely on tools like Netconf for remote configuration and management
 - Write ODIM Resource Adapters for such PNFs to enable standards-based manageability.
 - These adapters could talk CLI or NETCONF or Customer APIs on southbound and DMTF Redfish on the northbound
 - Advantage: One set of APIs for ONAP to manage all PNFs, where PNF vendors (or 3rd party ISVs) write such adapters for their custom PNF devices
- PNF Management Use cases
 - Vertical Scaling of PNFs
 - Compose new hardware with increased hardware resources
 - Vertical scaling of PNFs will need to follow Service Provider's hardware upgrade processes and procedures
 - PNF Resiliency
 - Handle failover independent of PNF implementation
 - PNF Life Cycle Management
 - Remote and/or Automated Configuration to handle changes in environments (like congestion due to specific event)
 - Seamless Upgrades of entire PNF, if there is OOB support

Call for Action

1. ODIM Contribution Areas
2. Links for Participation

ODIM Contribution Areas



Would you like to know more?

- Review other ODIM-related LFN DTF sessions
 - [ODIM Introduction](#)
 - [ODIM Build & Run](#)
 - [ODIM Release 1](#)
- We invite community and TSC participation
 - Website: <https://odim.io/>
 - WIKI: <https://wiki.odim.io>
 - Mailing list: <https://lists.odim.io/g/odim-general>

OLF NETWORKING

LFN Developer & Testing Forum



ODIM

OPEN DISTRIBUTED
INFRASTRUCTURE MANAGEMENT