



LFN Developer & Testing Forum

# **Anuket NFVI PDF 2.0 Definition**

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# Agenda

- What is PDF
- Benifits of PDF
- CMCC Data Model
- PDF 2.0 Definition
- PDF 2.0 Implementation
- PDF Status and Next Step

# what is PDF

PDF(Pod Description File), compliant with CNTT RI1(Reference Implementation), covering the definition from Chapter 05 - Hardware Delivery and Configuration Requirements and Chapter 06 - Installer Requirements, it is a descriptor of the whole resource pool, including the hardware resource information and the parameters needed by software installer.

# Benifits of PDF

As we known, the NFVi is deployed upon a set of hardware resources, so a full list of hardware information is needed in installation, PDF is created with the purpose of providing all the value for cloud deloyment. It could be used in the following project:

- PDF as data source for HDV & SDV tool in CIRV project

- PDF as data source building and installing community lab in Pharos project

- PDF as the standard data model for NFVi CICD system

The all-in-one description file, can be used by multiple tools, saving tons of effort on collecting the information needed by installer or automation tools. And we also recommand using PDF as the unique datasource and continuously optimize it, so it can be adapted by many other tools, and brings more benifits

# CMCC Data Model

With R1 definition as reference, CMCC has collected several tables as data model while developing internal automation tools, and then put this data model into practice, this descriptor is used in multiple scenarios:

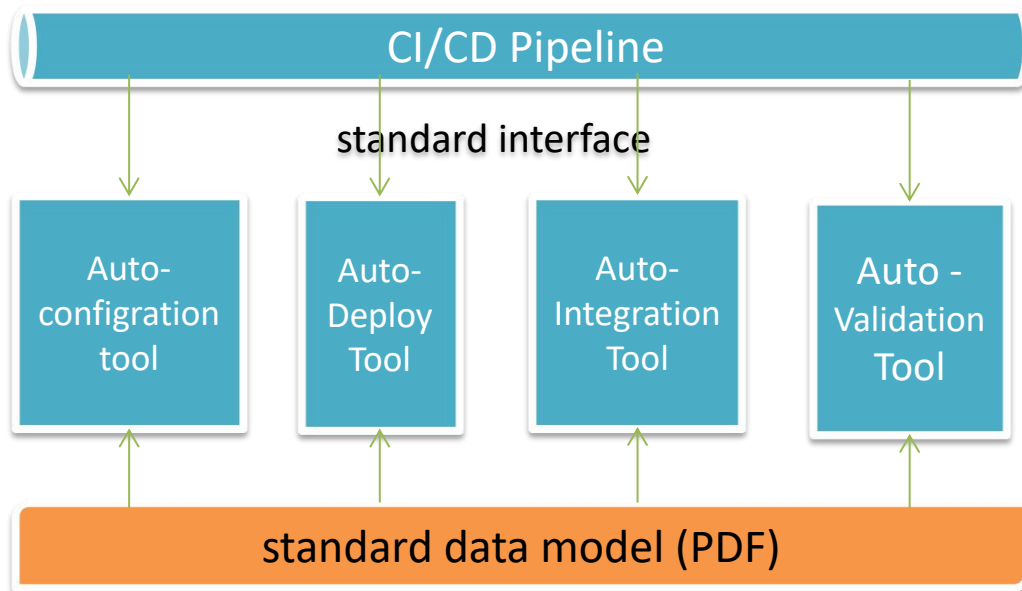
- Hardware & software integration verification

- Hardware integration acceptance test in production ENV

- Software integration deployment in CICD practice

# CMCC Data Model

After 2 trial cloud deployment in China with implementing CI/CD and description file, we find the CMCC internal data model could benifits to CI/CD cloud deployment of large-scale resource pool.



PDF is the fundemental data in CI/CD framework, providing data for all the tools in CMCC CI/CD system of cloud deloyment

# CMCC Data Model

The CMCC Data Model contains all the hardware information which is used by hardware&software integration & validation, how they will be used in software integration to build the cloud infrastructure, parameters that are used by the installer for the cloud infrastructure deployment and integration

CMCC  
Data  
Model

Global info & parameters

physical info for each device

Nic and slot mapping for each device model

Nodes set for HA&Storage pool&VIM&SND

Storage cluster and storage pool info

Network planning table

Network configuration for each TOR&EOR

Integration parameters for VIM & storage

# PDF 2.0 definition

We have been working on PDF 2.0 model and RI definition for a while, we are now updating PDF2.0 with definition from CMCC data model, to optimize PDF2.0. We would like to share the detail definition of PDF 2.0:

- **resource pool info:**
  - resource pool type, and pool name which compliance with naming rule
- **rack info:**
  - room info, rack row, rack number, rack name mapping
- **server info for each node:**
  - server name, vendor, SKU, SN, rack, position, BMC IP&gateway&mask, subnet, BMCcredential, hardware region, module name, pre\_configured, service IP gateway, mask, etc
- **slot - port mapping** for each type of server
- **Switch info for each device:**
  - name, vendor, SKU, model, SN, rack, position, BMC IP&gateway&mask, BMC credential, enable password, module name, service gateway&mask, BMC\_VLAN\_ID,etc



# PDF 2.0 definition

- **EOR\_slot info:** slot type and slot ID, port type and EOR type for each EOR
- **Wiremap:** ports mapping for each physical cable
  - Including local and remote device name, connected port, device type, line type
- **Host HA Mapping info:** including server list for each HA
- **Control server set:** including server list for control nodes
- **SNDC server set:** including server list for SDNC nodes
- **Storage pool plan:** including server list for each storage pool and Storage cluster mapping
- **VLAN planning table:**
  - VLAN ID for each network plane, allocated IP range and gateway, and the applied node set for each VLAN, this table comes from network plan from VIM and storage vendor
- **TOR and EOR VLAN:**
  - vlan configuration for each port on each related TOR and EOR. information in this table will be used for switch auto-configuration and auto-verification before cloud deployment stage.

# PDF 2.0 definition

- **Host Aggregate:** HA metadata and corresponding AZ for each HA
- **Global Settings:**
  - IP type, enable hugepage, hugepage size, hypervisor cores, network type, timezone, QinQ enabled, NTP server IP
- **Standard network parameters:** MTU for each network plane
- **Distribution storage pool info:**
  - Storage cluster name, storage pool name, AZ name, HA name, nodes number, capacity, network management interface, VIM and PIM credential, cluster service and backend ip range and gateway, backup policy
- **NIC connection:**
  - slot port and network plane & BDF mapping for each type of server, which will be used to locate the logic nic name in OS
- **VIM and storage context, client joint table:**
  - contains parameters from VIM and storage vendor, used for integration after VIM and storage deployment, so they would be de-coupled in installation & integration process.
- **Server & switch PIM account** for each type of server/switch

# PDF 2.0 template

You can find PDF definition and template in below link.

- PDF definition
  - Hardware Delivery and Configuration Requirements  
[https://github.com/cntt-n/CNTT/blob/master/doc/ref\\_impl/cntt-ri/chapters/chapter05.md](https://github.com/cntt-n/CNTT/blob/master/doc/ref_impl/cntt-ri/chapters/chapter05.md)
  - Installer Requirements  
[https://github.com/cntt-n/CNTT/blob/master/doc/ref\\_impl/cntt-ri/chapters/chapter06.md](https://github.com/cntt-n/CNTT/blob/master/doc/ref_impl/cntt-ri/chapters/chapter06.md)
- PDF 2.0 template  
[https://github.com/opnfv/cirv-sdv/blob/master/sdv/pdf/template/pdf\\_template.json](https://github.com/opnfv/cirv-sdv/blob/master/sdv/pdf/template/pdf_template.json)



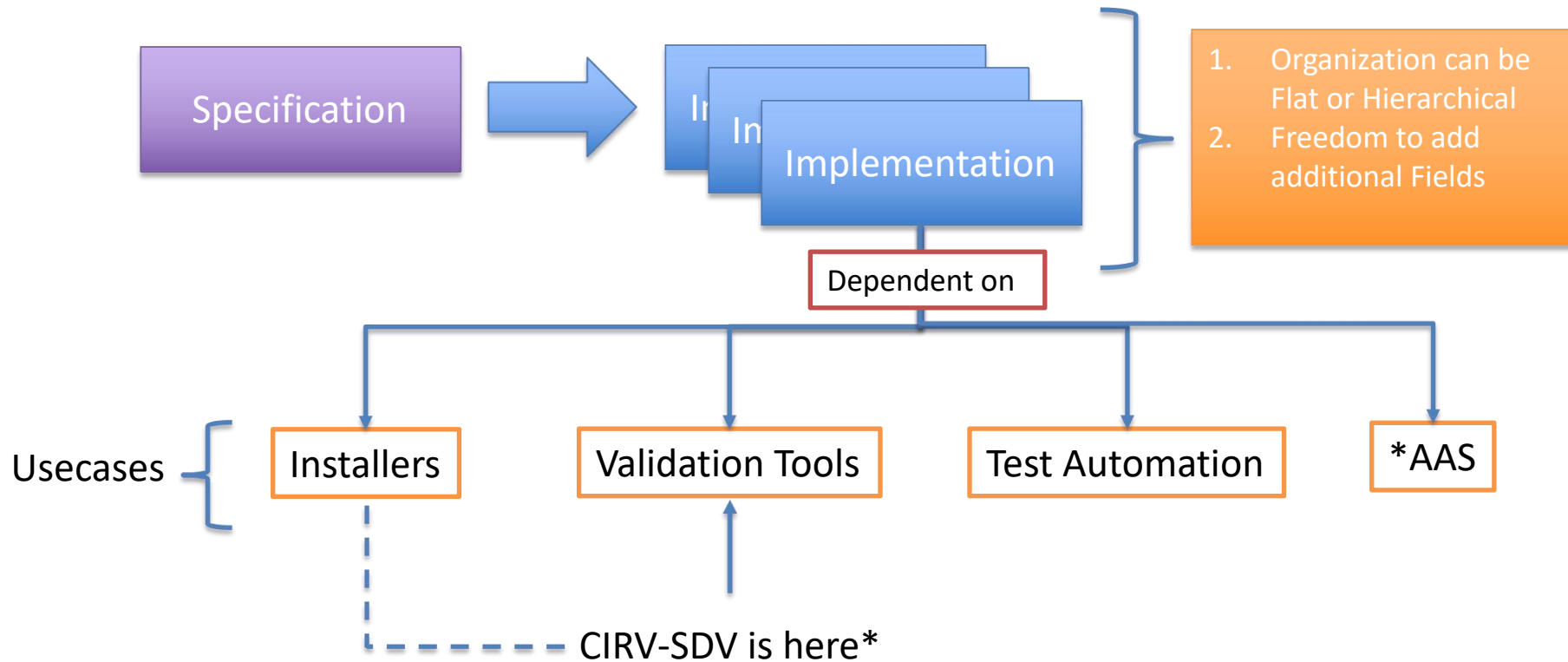
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**PDF 2.0 Implementation  
Case-Study in OPNFV  
[CIRV-SDV]**

# Our Perspective on PDF 2.0



# Implementation Challenge

- Scaling.
- Two Approaches.
  - Automatically Read (AR)
  - Manual + Extrapolate
- Combinations of the above 2.
- But ...

- **Static Data**
  - Exists.
  - Readable (automatically) anytime.
  - Remains the same.
  - Enter minimal info manually
  - Fixed across set of nodes (“Roles”)
- **Design Data**
  - User Defined.
  - Configured/Customized.
  - Readable (automatically) only after the configuration.
  - May-Change
  - Enter manually.
  - May or may not be fixed across set of nodes (“Roles”)
    - Ex: Ip Address, NodeID, etc.
- For Installer Usecase and pre-deployment validation usecase, extrapolation becomes mandatory
  - As configuration is NOT-YET done.

# PDF 2.0 in CIRV-SDV

- GUI Tool for Manual Entry
- PDF 2.0 Template in json for Manual Entry
- Tool for Extrapolation
- Use the extrapolated PDF for Pre and post-deployment validation.
- Supports all the fields presented \*



# Quick Demo.

<https://github.com/opnfv/cirv-sdv/tree/master/sdv/pdf/site>

<https://github.com/opnfv/cirv-sdv/blob/master/sdv/docker/sdvconfig/extrapolation/extrapolation.py>

# PDF 2.0 Status

With PDF as one of the best practice of CI/CD, we would like to take this opportunity to introduce PDF 2.0, and hopefully it could be used by more tools or project in Anuket, and providing feedback so we can continuously optimize PDF definition.

Currently we are updating PDF 2.0 model and definition in RI, this version is already been certified the ability of support large-scaled cloud deployment. We plan to release the full PDF2.0 definition in the next Anuket release.

CMCC is also working on populating PDF 2.0 to other VIM and storage vendors, so all different partners in the deployment project will be using same and unique version of PDF for deployment & integration.

We are continuously working on optimize PDF2.0 definition based on the experience from CMCC trial cloud deployment and CICD practice

# PDF Next step

## Project for PDF

- We would like to re-active pharos project as a host for PDF topic, we will keep working on PDF definition in pharos project, maintain and build lab resources according to PDF definition.

## Next stage(maybe PDF3.0):

Adding PDF definition with configurations&values for APP installation/delpoyment, we would like to have some discussion with RI1 and RI2.

- provide what parameters are needed to define the PDF model for next stage
- common and specialized configurations for openstack and k8s senario

## Active contributor:

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**Thank You!**