SOL001 ed281 key changes:

1) In VNFD/NSD single DF design, it allows defining the VNF/NS specific node type in a standalone file other than in the main VNFD/NSD service template
2) Updated the imports statement of the NSD example in Annex A, indicating that in a NSD service template, it has to contain the imports statement of the yaml file which includes the VNF specific type definition, such file might be included in the NSD file structure.
3) Added the VNF specific type naming rules,
   a) VNF specific extension datatypes should be given names starting by the provider name followed by a dot (".")
   b) VNF specific Vdu.Compute node types should be given names starting by the provider name followed by a dot (".")
   c) VNF specific interface types should be given names starting by the provider name followed by a dot (".")
4) Added geographic coordinates support in a PNFD: Based on the geographic coordinate definition in RFC6225.
5) Clarified that the monitoring_parameters as defined in a VNF node type, is only used in a VNFD service template design.
6) Fixed optional properties with default value. Properties with a default value and required=false are changed to required=true
7) Text is added to the NSD service template(s) design to specify that the imported topology template shall be ignored if it has.

SOL004 ed281 key changes

- TOSCA Meta File key words are corrected to make them explicitly related to ETSI defining new TOSCA Meta file keynames and structure
- Description for License and Testing files is changed to specify that the location and name indicated in the entry in the TOSCA.meta refers to a directory
- Move the content in 4.1.4 as a subclause of 4.1.3, so it is clear that the metadata extension for YANG is only for the CSAR without TOSCA-Metadata directory case
- Fix some inconsistence issues for PNFD archive:
  o PNFD can also have YANG based representatives,
  o add new Required column in table 6.3.2-1 and 4.3.2-1.
  o Non-MANO artefact is also applicable for PNFD archive
- Clause 5.4 uses "Entry-Certificate" keyname, whereas clause 4.1.2.3 describes ETSI-Entry-Certificate. Update clause 5.4 to use ETSI-Entry-Certificate
- Neither SOL004 nor TOSCA states what is the expected format of the ZIP. Thus, it causes NFVO and VNFM to reject some of the VNF packages, because it is not able to decompress it. Add proper references and compression methods
- Correcting the Issue with signing multiple files in the same directory that have the same name but different extensions.:
  o Keep the original extension of the file when creating the name of the signature file (e.g. script.sh ⮕ script.sh.sig instead of script.sig)
  o As there is a requirement to keep this change BWC, allow the old scheme as well.
  o NOTE: When searching for a signature file for file.ext, this implies that a client would need to look for file.sig and file.ext.sig.

SOL007 ed281 key changes

1) Changed the reference to tosca-simple-profile-yaml v1.2, and would not support the CSAR design as defined in any earlier version than tosca-simple-profile-yaml v1.1.
2) made it clear that the "yang_definitions" metadata extension is only for the CSAR without TOSCA-Metadata directory case.
3) updated clause 5.4 to use ETSI-Entry-Certificate.
4) specified that the testing information indicated in the entry in the TOSCA.meta refers to a directory.
5) updated the Normative references for TOSCA Simple Profile in YAML Version 1.2.
6) compression methods in SOL007 comform to ISO/IEC 21320-1 "Document Container File — Part 1: Core".
7) Kept the original extension of the file when creating the name of the signature file (e.g. script.sh à script.sh.sig instead of script.sig) and kept this change BWC, allowed the old scheme as well.

SOL002 ed281 key changes

- Added new attribute to the "AffectedVirtualLink" to signal what "LinkPorts" are added or removed, as long as these are or have been present in the "VnfVirtualLinkInfo" structure.
    o clause 5.5.2.17: added affectedExtLinkPorts attribute to VnfLcmOperationOccurrenceNotification.
    o clause 5.5.3.8: improved description of vnfExtCpId, cpProtocolInfo and vnfLinkPortId, and added NOTE 2 and 3 to clarify relationship between VNFC CP and EXT CP.
    o clause 5.5.2.13: added affectedExtLinkPorts attribute and NOTE 2 to VnfLcmOpOcc.
    o clause 5.5.3.20a: new data type of AffectedExtLinkPort

- clause 6.5.2.5: Added "pmJobId" attribute to the "PerformanceInformationAvailableNotification" data type.

- clause 5.5.2.7: Added the attributes "extensions" and "vnfConfigurableProperties" to the "ChangeVnfFlavourRequest" structure.

- Improve explanation of extensions, metadata, addationalParams and vnfConfigurableProperties
    o clause 5.5.2.2: improved description of VnfConfigurableProperties and extensions.
    o clause 5.5.2.3: improved description of metadata.
    o clause 5.5.2.4: improved description of extensions, additionalParams and vnfConfigurableProperties.
    o clause 5.4.3.3.4: added postcondition and sentence
    o clause 5.4.4.3.1: added postcondition and sentence
    o clause 5.4.7.3.1: added postcondition and sentence

- The 422 error code has been added to the response bodies of the operations that invoke endpoint testing:
    o clause 5.4.2.3.1: POST method when creating a VNF instance resource.
    o clause 6.4.2.3.1: POST method when creating a PM job.
    o clause 6.4.3.3.4: PATCH method when modifying an "individual PM job" resource.
    o clause 6.4.5.3.1: POST method when creating a threshold.
    o clause 6.4.6.3.4: PATCH method when modifying an "Individual threshold" resource.

- Changes related to the testing of the notification endpoint, with the updating in the wording and sequence diagrams in the "Flow of managing subscriptions" for these interfaces for these interfaces:
    o clause 5.3.8: VNF Management interface
    o clause 6.3.1, clause 6.3.1a, clause 6.3.5 and clause 6.3.5a: VNF Performance Management interface

- o clause 7.3.4: VNF Fault Management interface
- o clause 8.3.3: VNF Indicator interface

- Updated the API version identifiers as applicable, based on the magnitude and category of applied changes.
  - o clause 4.1 : increased API version of VNF LCM and VNF FM

- One step added in the flow of threshold deletion and updated step #2 of the flow of PM job deletion.

- Updated note of extManagedVirtualLinks
  - o clause 5.5.2.4: added note
  - o clause 5.5.2.7: added note

- Introduced Merge Patch
  - o clause 5.5.2.24: improved description of id and vnfcConfigurableProperties
  - o clause 5.5.2.12: deleted vnfcInfomodificationsDeleteIds attribute
  - o clause 5.5.2.12a: deleted vnfcInfomodificationsDeleteIds attribute

- Introduced Graceful stop/termination
  - o clause 5.5.2.8: added gracefulTerminationTimeout attribute to TerminateVnfRequest
  - o clause 5.5.2.10: added gracefulStopTimeout to OperateVnfRequest.
  - o clause 5.5.4.4: new Enumeration StopType

- Updated description of vnfcInstanceId
  - o clause 5.5.2.9: improved description of vnfcInstanceId
  - o clause 5.5.2.10: improved description of vnfcInstanceId
  - o clause 7.5.2.4: improved description of vnfcInstanceIds
  - o clause 9.5.3.4: improved description of vnfcInstanceIds

- clause 5.4.1.2: added postcondition to task resource
- clause 5.4.2.3.1: added precondition and postcondition when creating a VNF instance resource
- clause 5.5.2.13: improved description of grantId.
- clause 5.5.3.23: improved description of vnfcResourceInfoId, and change cardinality of it.
- clause 5.5.2.17: improved description of subscriptionId, vnfLcmOpOccId and _links. Added "ROLLED_BACK" state to description of error.
- Updated description of subObjectInstanceIds
  - o clause 6.5.2.8: improved description of subObjectInstanceIds
  - o clause 6.5.2.9: improved description of subObjectInstanceIds

SOL003 ed281 key changes

Unless otherwise stated, all changes also apply to both SOL002 and SOL003.

5 VNF LCM API

5.3.8 Flow of LCM subscriptions

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement)

5.4.1.2 Task resources that trigger VNF LCM operations

Making explicit that the "operationState" in the LcmOpOcc shall be set to "STARTING" when this resource is created.

5.4.2.3.1 POST (creating new VNF instance resource)

- clarify that the precondition is that the VNF package is onboarded and enabled.

- add 422 response in case of VNF package does not exist or is not enabled

- make a statement that metadata when passed during VNF instance resource creation need to be processed following JSON Merge Patch

5.4.3.3.4 PATCH (Modifying a VNF instance)

- make a statement that "extensions" and "vnfConfigurableProperties" attributes in the "InstantiateVnfRequest" shall be applied following JSON Merge Patch, and when/ how to validate these changes

5.4.4.3.1 POST (instantiating a VNF instance)

- make a statement that "extensions" and "vnfConfigurableProperties" attributes in the "InstantiateVnfRequest" shall be applied following JSON Merge Patch, and when/ how to validate these changes

5.4.7.3.1 POST (changing deployment flavour)

- make a statement that "extensions" and "vnfConfigurableProperties" attributes in the "InstantiateVnfRequest" shall be applied following JSON Merge Patch, and when/ how to validate these changes

5.5.2.2 Type: VnfInstance

- clarify that initial values for metadata, vnfConfigurablePrperties and extensions can come from VNFD-defined defaults, or (for metadata only) from the CreateVnfInstance request.

5.5.2.3 Type: CreateVnfRequest

- refer to a normative statement how to handle metadata during VNF instance creation.

5.5.2.4 Type: InstantiateVnfRequest

- refer to a normative statement how to handle extensions and vnfConfigurableProperties during VNF instantiation.

- provide a clarification regarding externally-managed internal VLs, as copied from the IFA007 spec (no change to implementation).

5.5.2.7　Type: ChangeVnfFlavourRequest

- provide a clarification regarding externally-managed internal VLs, as copied from the IFA007 spec (no change to implementation).

- add "extensions" and "vnfConfigurableProperties" attributes to the request

5.5.2.13　Type: VnfLcmOpOcc

- normative clarification how to set the grantId

- addition of "affectedLinkPorts" attribute

- add a clarification how to use "AffectedVirtualLink" and "AffectedLinkPorts" to signal changes that involve linkports

5.5.2.17　Type: VnfLcmOperationOccurrenceNotification

- normative clarification how to set the subscriptionId, vnfLcmOpOccId and _links

- addition of "affectedLinkPorts" attribute

- add a clarification how to use "AffectedVirtualLink" and "AffectedLinkPorts" to signal changes that involve linkports

5.5.3.5　Type: VnfcResourceInfo

- clarify that information about those internal CPs that are "exposed as" or "connected to" an external CP shall be made available; information about other (entirely internal) CPs may be made available. Note that this restriction does not occur in SOL002 – information about all internal CPs is mandatory to be provided here.

- clarify that cpProtocolInfo can be opmitted for internal CPs if these are exposed as external CPs (to avoid redundant information)

5.5.3.14　Type: AffectedVirtualLink

- add an attribute "vnfLinkPortIds" that allows to signal the IDs of link ports that have been added to or removed from the virtual link.

5.5.3.14a　Type: AffectedExtLinkPort

This data type has been newly added in 2.8.1.

6 VNF PM API

6.3.1　Flow of creating a PM job

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement)

6.3.1a Flow of updating the callback URI of a PM job

Same as 6.3.1

6.3.5 Flow of creating a threshold

Same as 6.3.1

6.3.5a Flow of updating the callback URI of a threshold

Same as 6.3.1

6.4.2.3.1 POST (Create PM Job)

Add 422 response for failed test of notification endpoint.

6.4.3.3.4 PATCH (Update callbackUri in PM job)

Add 422 response for failed test of notification endpoint.

6.4.5.3.1 POST (Create threshold)

Add 422 response for failed test of notification endpoint.

6.4.6.3.4 PATCH (Update callbackUri in threshold)

Add 422 response for failed test of notification endpoint.

6.5.2.5 Type: PerformanceInformationAvailableNotification

Add pmJobId attribute to refer to the related PM job (link to the PM job was already there).

7 VNF FM API

7.3.3 Flow of managing subscriptions

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement)

8 VNF Indicator API

8.3.3 Flow of managing subscriptions

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement)

9 Granting API (not in SOL002)

9.5.2.3 Type: Grant

Added a few normative provisions for the NFVO regarding conditions and content of certain attributes to make explicit certain previously implicit assumptions.

9.5.3.2 Type: ResourceDefinition

Made explicit information that was previously implicit related to the type of resource template to reference for which change type.

10 VNF package management API (not in SOL002)

10.3.5: Flow of managing subscriptions

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement)

10.4.5a.3.2 GET (artifacts bulk-fetch)

Added a URI query parameter "include_external_artifacts" that allows to include downloaded external artifacts into the bulk fetch

10.5.3.2 Type: VnfPackageSoftwareImageInfo

The modelling for external artifacts introduced in 2.7.1 was missed to be applied to external software images in 2.7.1. In 2.8.1, the representation of external software images is aligned with the representation of external artifacts (using separate "imagePath" and "imageUri" attributes).

10.5.4.4 Enumeration: PackageUsageStateType

The condition for a VNF package to be "in use" has been changed from "VNF instantiated" to "VNF instance resource created".

11 Virtualised Resources Quota Available Notification interface (not in SOL002)

11.3.1 Flow of managing subscriptions

Reflecting the fact in the flow that testing of notification endpoint is mandatory. (It was already mandatory in the normative part, but the flows hinted at it being optional, so this is a consistency improvement).

SOL005 ed281 key changes

- Updated the description of the enumerated values of "PackageUsageType".

- Inserted postcondition in the sequence diagrams of the flows of the "creation of an individual NS descriptor resource", "update of an individual NS descriptor resource", "querying/reading of NS descriptor resources", "creation of an individual PNF descriptor resource" and "querying/reading of PNF descriptor resources".

- Postcondition added in the steps of flow of the deletion of an individual NS descriptor resource.

- inserted postcondition in the sequence diagrams of the flows of the "creation of an individual VNF package resource" and "querying/reading VNF package information".

- Artifacts that are not software images and that are external to the VNF package shall be excluded from the archive unless the URI query parameter "include_external_artifacts" (flag) has been provided.

- Added the "VirtualStorageResourceInfo" data type.

- Changes to align with SOL016:
  - Adding normative provisions regarding the state of the "Individual VNF package" resources.
  - Add normative provisions regarding the handling of the NS LCM operations.
  - Add normative provisions to clarify the source of the identifiers of on-boarded NSD.
  - Clause 9.4.3.3.5: align the description of what it means having a running VNF instance with the actual meaning of the "IN_USE" as currently specified in clause 9.5.4.5.

- Updated attributes descriptions and added two new notes in the "VnfcResourceInfo" data type.

- Added new attribute to the "AffectedVirtualLink" to signal what "LinkPorts" are added or removed, as long as these are or have been present in the "NsVirtualLinkInfo" structure.

- Added a note in "AffectedVirtualLink" data type.

- Added "pmJobId" attribute to the "PerformanceInformationAvailableNotification" data type.

- Added the attributes "extensions" and "vnfConfigurableProperties" to the "ChangeVnfFlavourRequest" structure.

- Included a note in "ChangeVnfFlavourData" data type structure.

- The 422 error code has been added to the response bodies of the operations that invoke endpoint testing:
  - POST method when creating a PM job.
  - PATCH method when modifying an "individual PM job" resource.
  - POST method when creating a threshold.
  - PATCH method when modifying an "Individual threshold" resource.

- Added new attribute "imageUri", and update the existing "imagePath" attribute description.

- Changes related to the testing of the notification endpoint, with the updating in the wording and sequence diagrams in the "Flow of managing subscriptions" for these interfaces for these interfaces:
  - o NSD Management interface
  - o NS Lifecycle Management interface
  - o NS Fault Management interface
  - o VNF Package Management interface

- Updated the API version identifiers as applicable, based on the magnitude and category of applied changes.

- Updated the description of VNFD/NSD content in the response zip file in the GET methods (clauses 5.4.4a.3.2 and 9.4.4.3.2).

- One step added in the flow of threshold deletion and updated step #2 of the flow of PM job deletion.

- Updated the note of the "VnfExtCpConfig" data type.

- The following attributes descriptions of the "VnfInstance" data type were updated:
  - o vnfInstanceName
  - o vnfInstanceDescription
  - o vnfdId
  - o vnfPkgId
  - o vnfConfigurableProperties
  - o metadata
  - o extensions