Overview of MPEG's Network Based Media Processing (ISO/IEC 23090-8)

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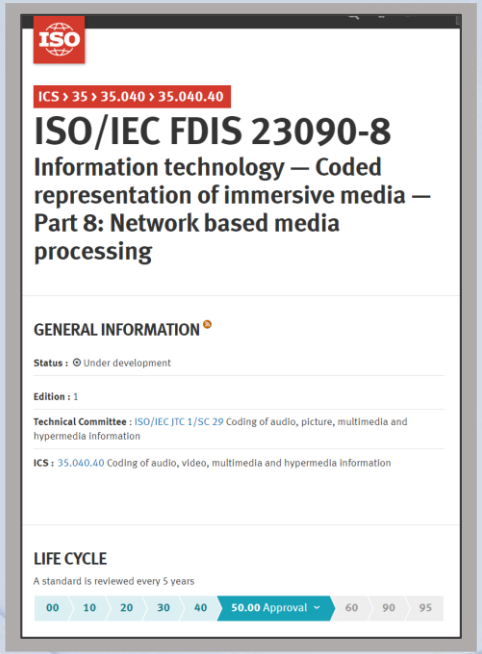
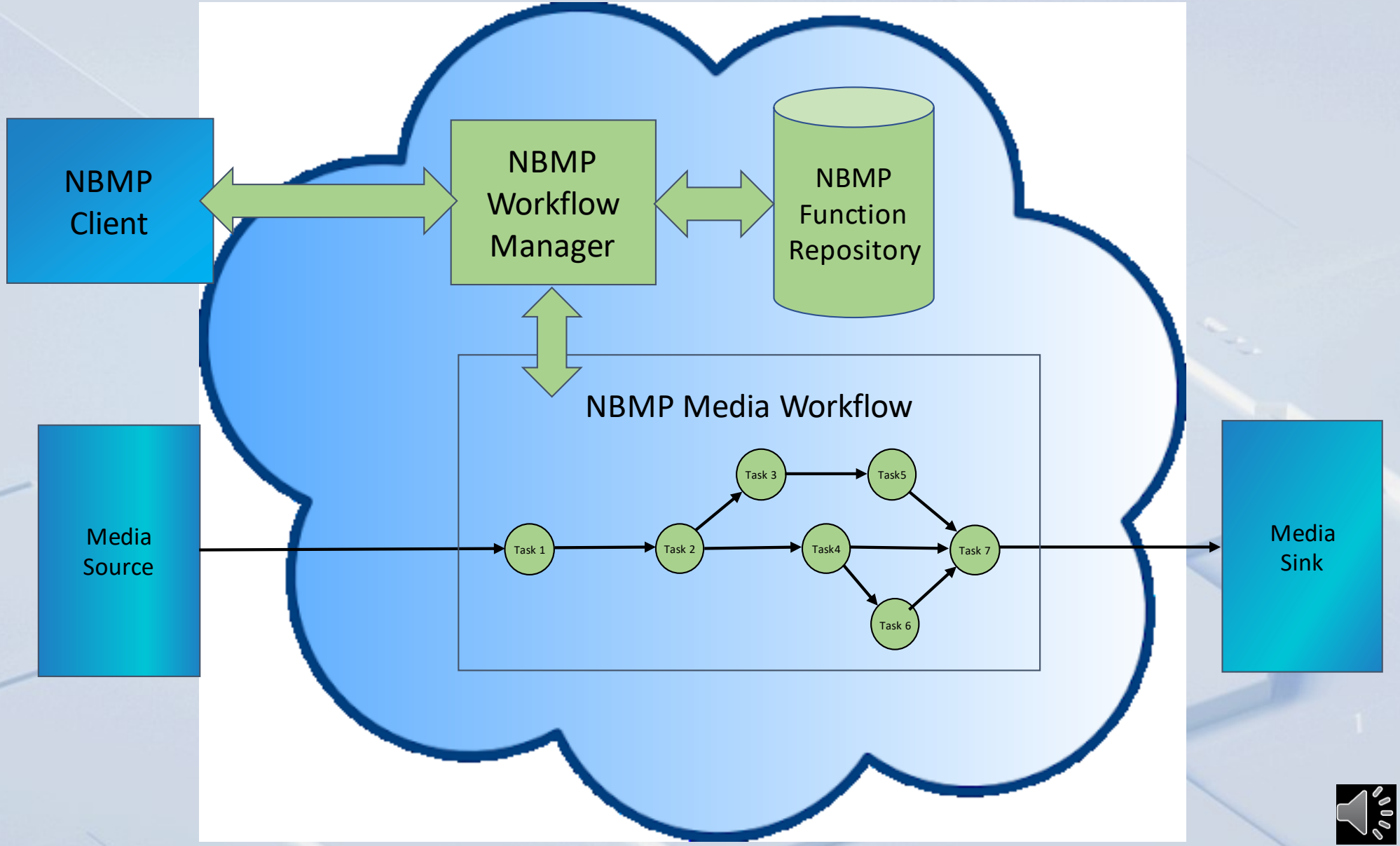
Media in Cloud

- Process the media in cloud such as ingest, transcoding, view creating, packaging, interactive session creation, and running the service
- Technical Challenges:
  - Building complex services from micro-services
  - Deploy configurable services in cloud or cross cloud services
  - Create services using multiple vendor tools

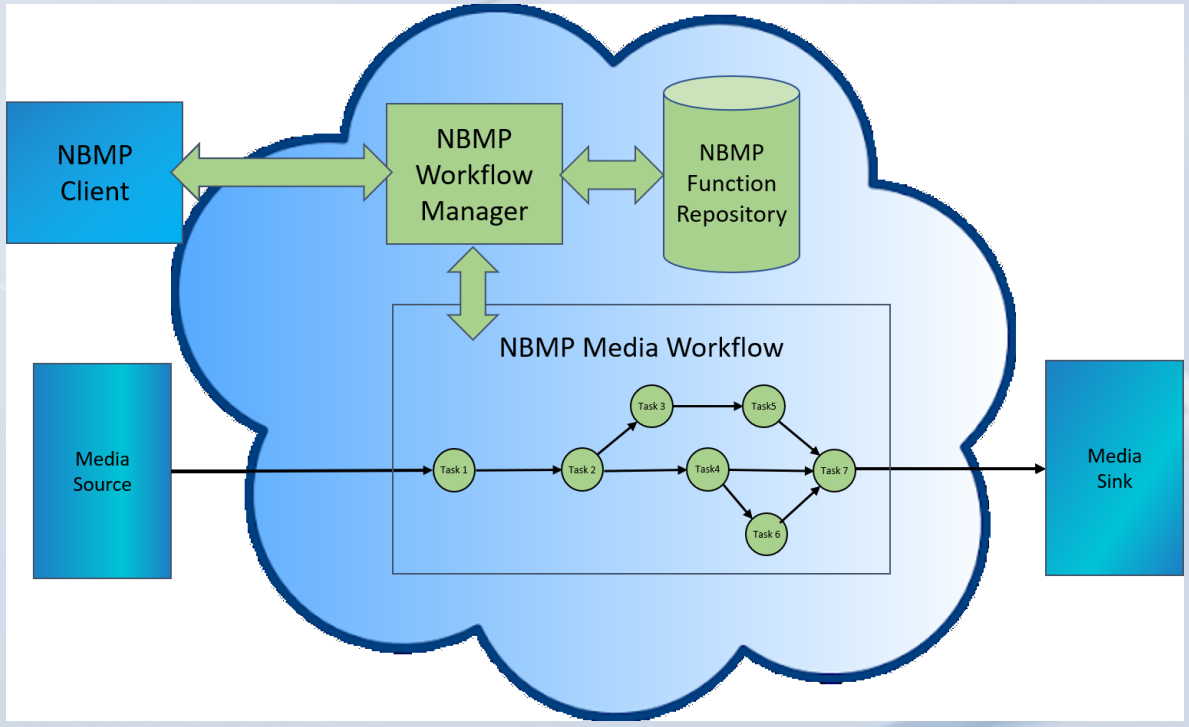
MPEG NBMP Standard



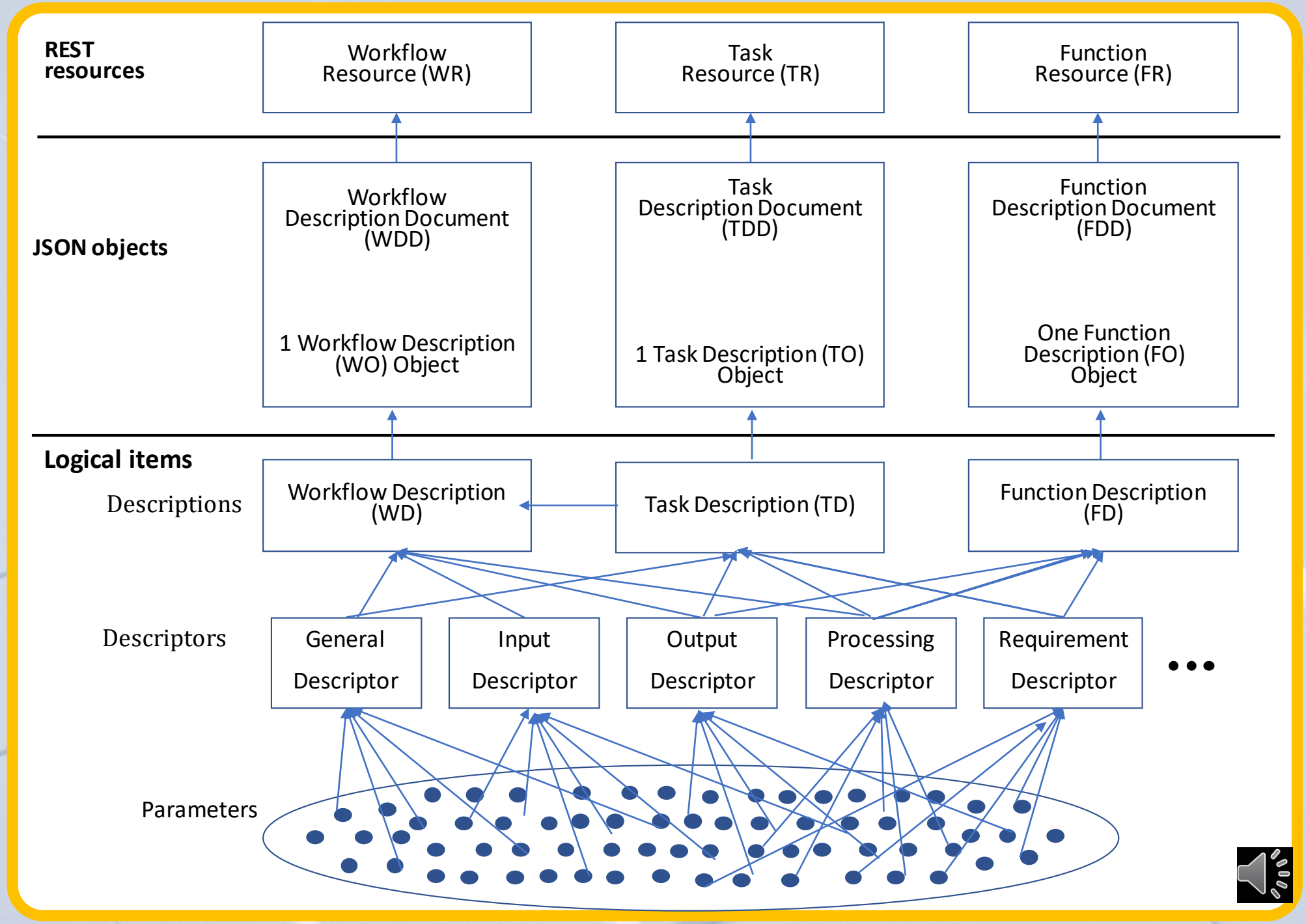


NBMP Specification Normative Scope

- Three API:
  - APIs: Workflow, Task, Function Discovery
  - Each API consists of Operations + Resource
    - Operation: API call
    - Resource: document like manifests
- Three Network Entities:
  - Workflow Manager, Task, Function Repository
  - Required behavior for each entity



NBMP Constructs



Workflow, Task and Functions APIs

Workflow
CreateWorkflow
UpdateWorkflow
DeleteWorkflow
RetrieveWorkflow

Task
CreateTask
UpdateTask
GetTask
DeleteTask

Function
DiscoverFunctions
DiscoverFunctionsInGroup
DiscoverGroupsOfFunction

- REST APIs
- Synchronous and asynchronous

Workflow, Task and Function Features

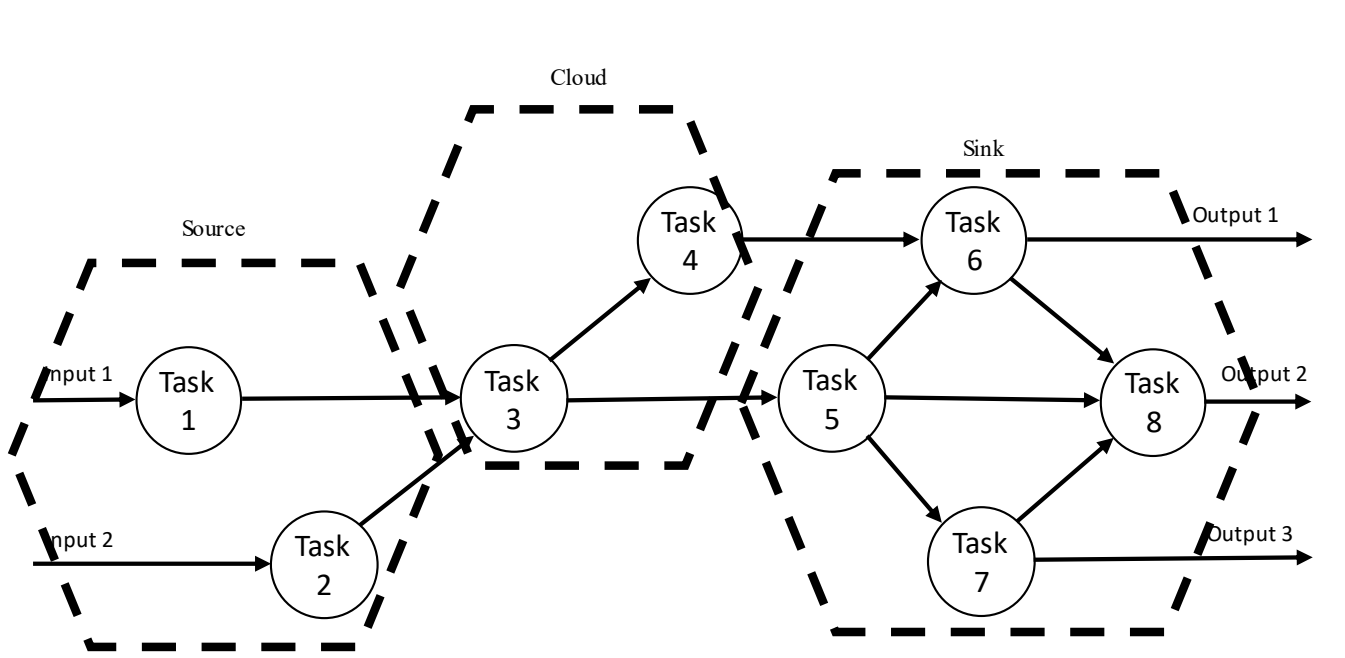
Workflow
State machine
Streaming and step-based modes

Task
State machine
Stream and step-based modes

Function
Multiple repositories
Static and dynamic images
Function groups
Resource estimators

Common Features	
Client-Assistance	Dynamic information about client
Failover	In the case of fail over
Monitoring	Live monitoring information
Assertion	Measures and remedies
Reporting	Operational reports
Notification	Notification of events
Acknowledge	If a request is granted

Workflow Splitting and reconfiguration



- Network/device capabilities discovery
- Workflow split based on proximity of the tasks to MPEs
- Workflow reconfiguration

Specification Status

- Core specification
  - ISO/IEC 23090-8: Core specification- FDIS balloting
  - ISO/IEC 23008-8 DAM1: Function templates and other improvements
    - Several function references
    - Various improvements
  - Technologies under Consideration:
    - MPE capabilities
    - Task grouping
    - Task distance
    - Workflow splitting
    - Extended step/parallel processing
- Implementation Guidelines
  - ISO/IEC 23090-11: Working Draft
- To do: Conformance and test vectors

NBMP for 5G networks

- Edge processing and split-rendering are major functionalities in 5G
  - Main Use-cases: media streaming, A/V/MR media , multi-players games
- No specific solution is adopted yet.
- Currently two study items in 3GPP on edge processing:
  - NBMP for FLUS (FS_FLUS_NBMP)
  - Extended Media Streaming Architecture (FS_EMSA)
- Standardization (Work Items) to follow

Summary

- NBMP provides a standard for deploying media services on cloud as workflow of micro-services
  - ISO/IEC 23090-8: finalized and to be published soon
  - More specification on its function templates, its enhancement and workflow split/split-rendering
- 3GPP has study items on network/edge processing on media on 5G networks
  - Split-rendering
  - Uplink and downlink streaming
  - Exact signaling and features yet to be defined

Thank you!