5G RAN Bulk PM

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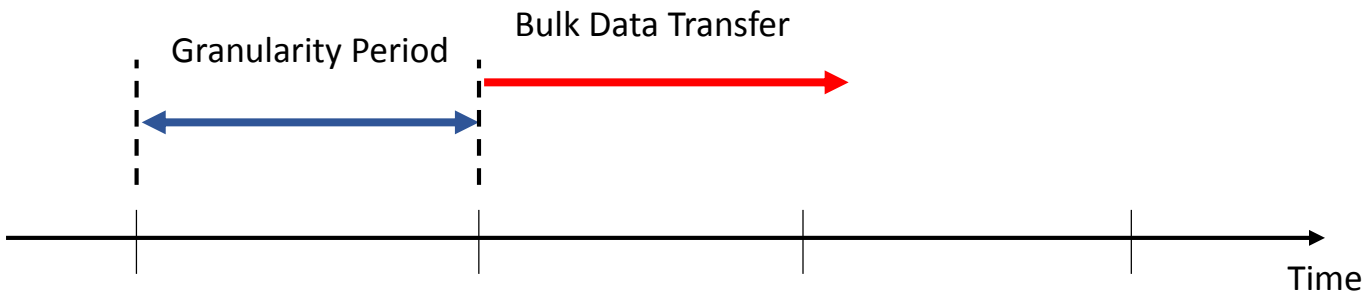
Casablanca – 5G Performance Analysis & Optimization

TOPIC	DESCRIPTION
Bulk performance measurement (PM) data collection	Enhance DCAE VES collection layer to support periodic (e.g. every 5 to 15 minutes) bulk data collection from VNFs and PNFs. Support both file-based collection and mapping to VES Events for chosen file content
High Volume and Near Real-time streamed data collection of Performance measurements	Enhance DCAE performance measurement (PM) data collection to support near real-time (order of seconds) data. Introduce a high-volume VES collector using a persistent connection (TCP socket), support a new data encoding (GPB). Distribute DCAE collection at the cloud edge (for scalability)
High Volume, Near Real-time streamed data collection using connection-less pub-sub mechanism	Enhance DCAE performance measurement (PM) data collection to support near real-time (order of seconds) data. Introduce a high-volume VES collector using a onnectionless pub/sub mechanism (DDS technology), support a new data encoding (GPB). Distribute DCAE collection at the cloud edge (for scalability)

3GPP Bulk PM Overview

- Measurements are collected by the NE (xNF) during each granularity period according to configured measurement jobs
- A report is generated at the end of the period
- Data for one or multiple granularity periods is transferred to an operations system



Measurement Definitions

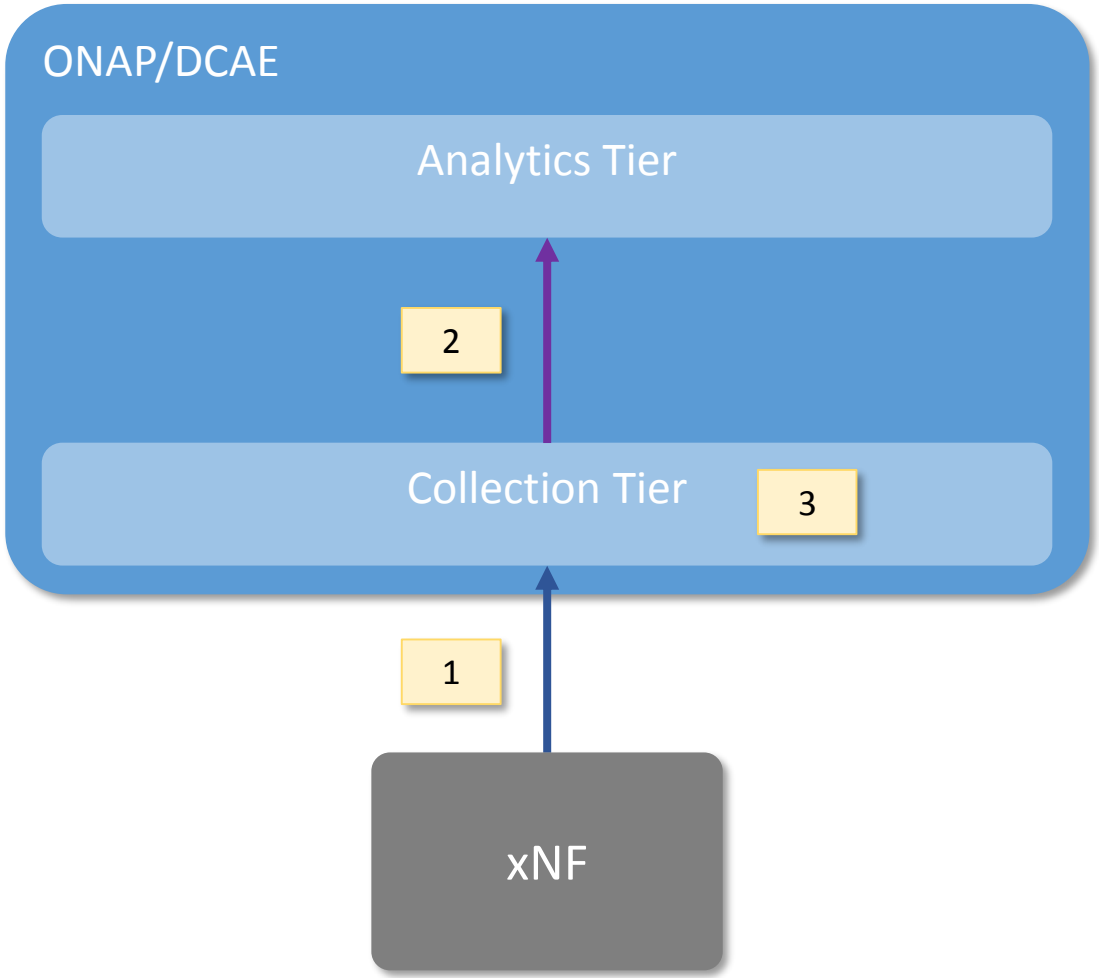
- Example for LTE (E-UTRAN)

Measurement Name	Attempted RRC connection establishments
Description (a)	This measurement provides the number of RRC connection establishment attempts for each establishment cause.
Collection Method (b)	CC (Cumulative Counter)
Condition (c)	Receipt of an RRCConnectionRequest message by the eNodeB/RN from the UE. […]
Measurement Result (d)	Each measurement is an integer value. […]
Measurement Type (e)	The measurement name has the form RRC.ConnEstabAtt.*Cause* where *Cause* identifies the establishment cause.
Object Class (f)	EUtranCellFDD, EUtranCellTDD

- Standard LTE measurements are defined in TS 32.425 (3GPP)
- Standard 5G RAN measurements are being defined in TS 28.552

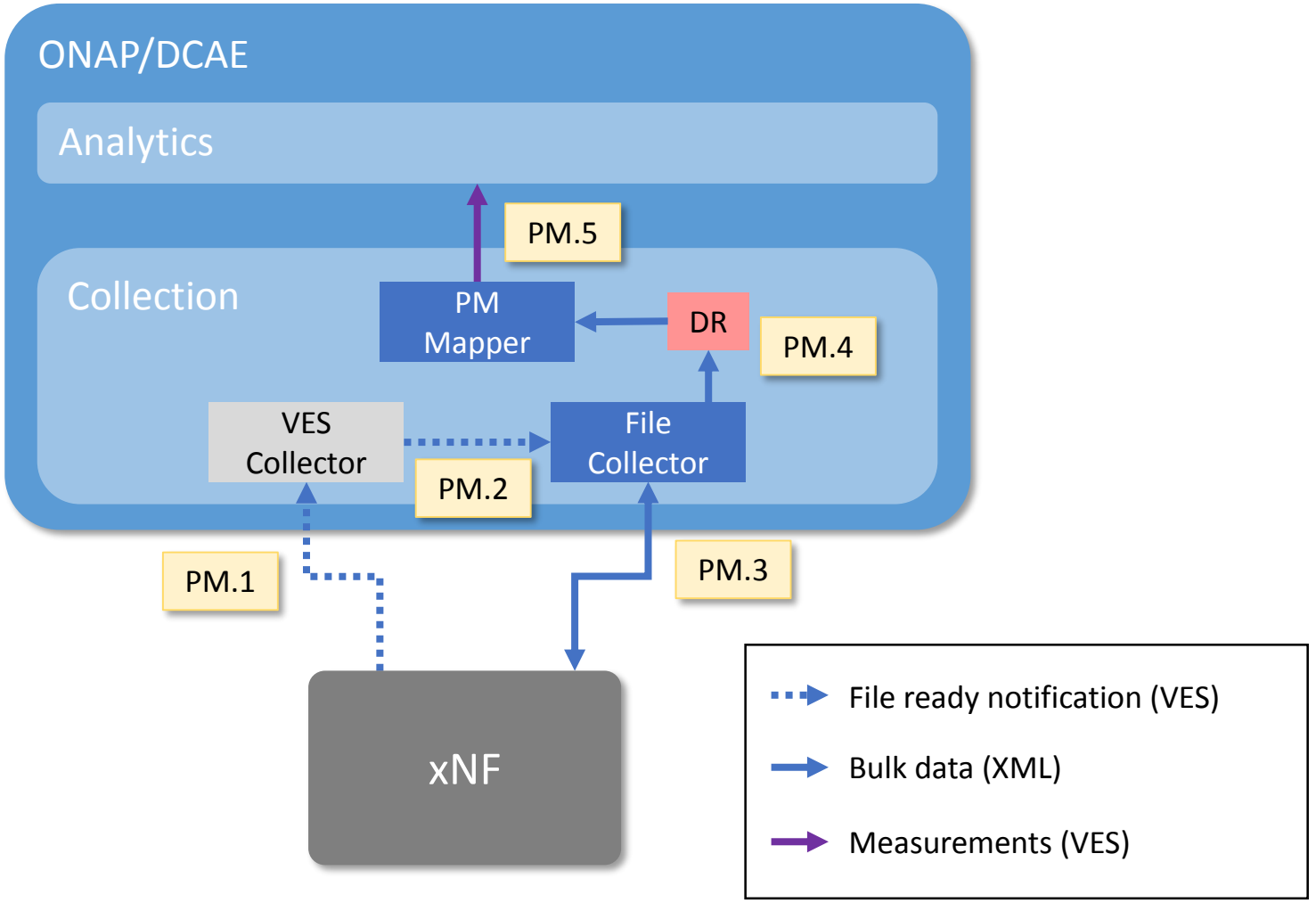
Solution Principles and Requirements

- The following aspects should be considered
  1. Support efficient transfer of bulk measurement data
  2. Support VES-formatted measurements for use by existing ONAP analytics components such as TCA
  3. Modular solution enabling component re-use as well as co-existence of multiple approaches for producers (xNF) and consumers (e g analytics)



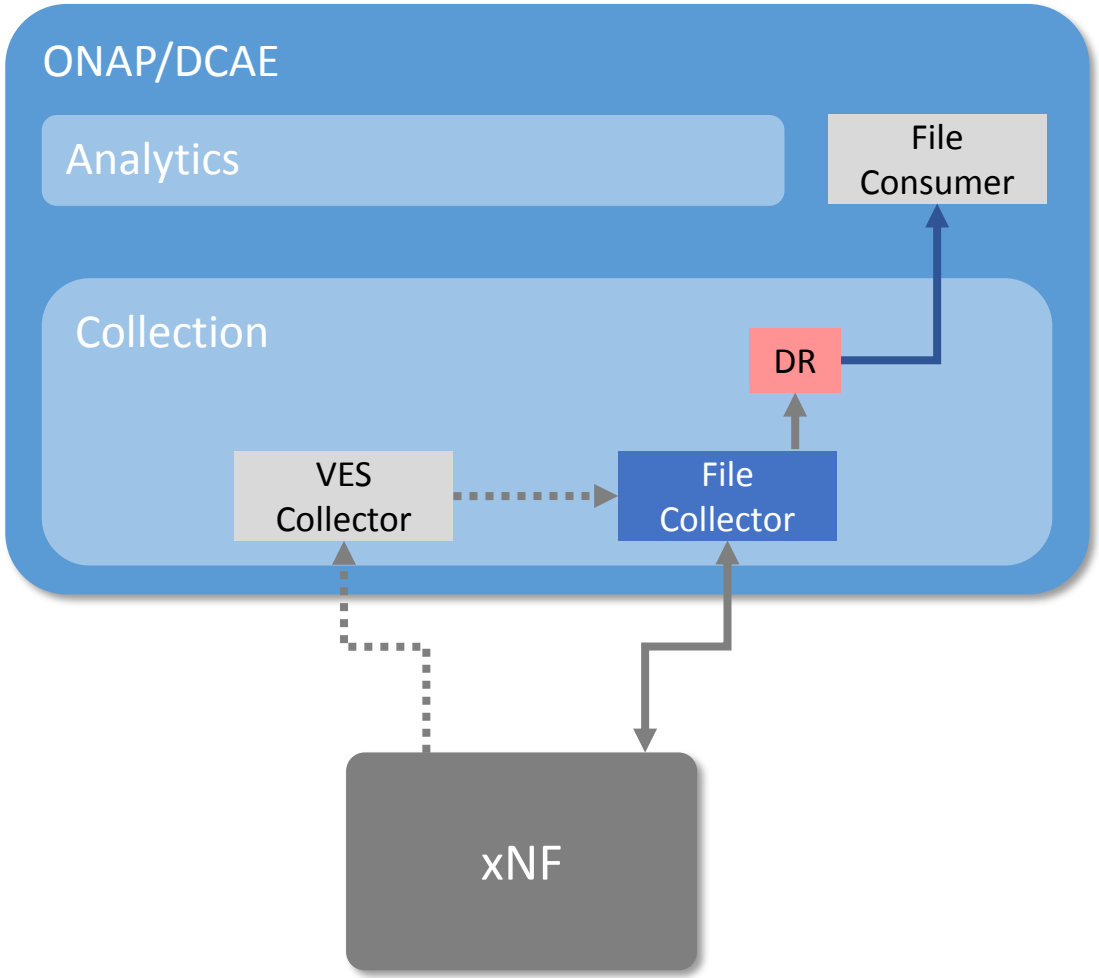
High Level Proposal

- Steps
  - [PM.1] At the end of each reporting period, a FileReady notification is sent to DCAE as a VES event
    - Location of the file is indicated in notification via URL
  - [PM.2] The notification is received and forwarded on DMaaP topic to the File Collector
  - [PM.3] The File Collector schedules and executes file retrieval using indicated protocol in URL, e g FTP(ES)
    - Format is 3GPP XML (TS 32.435) with optional gzip compression
  - [PM.4] The file contents are published on a DMaaP Data Router feed
    - Data Router is being added in DMaaP
  - [PM.5] The PM Mapper receives XML data from the DR feed and publishes mapped VES events on a DMaaP topic for further processing
    - A new VES domain is proposed for 3GPP measurements



File Consumer

- For some use cases the data consumer may prefer to receive the file in original format
  - In this case the file collector can be used without mapper component
  - The consumer subscribes directly to the DR feed

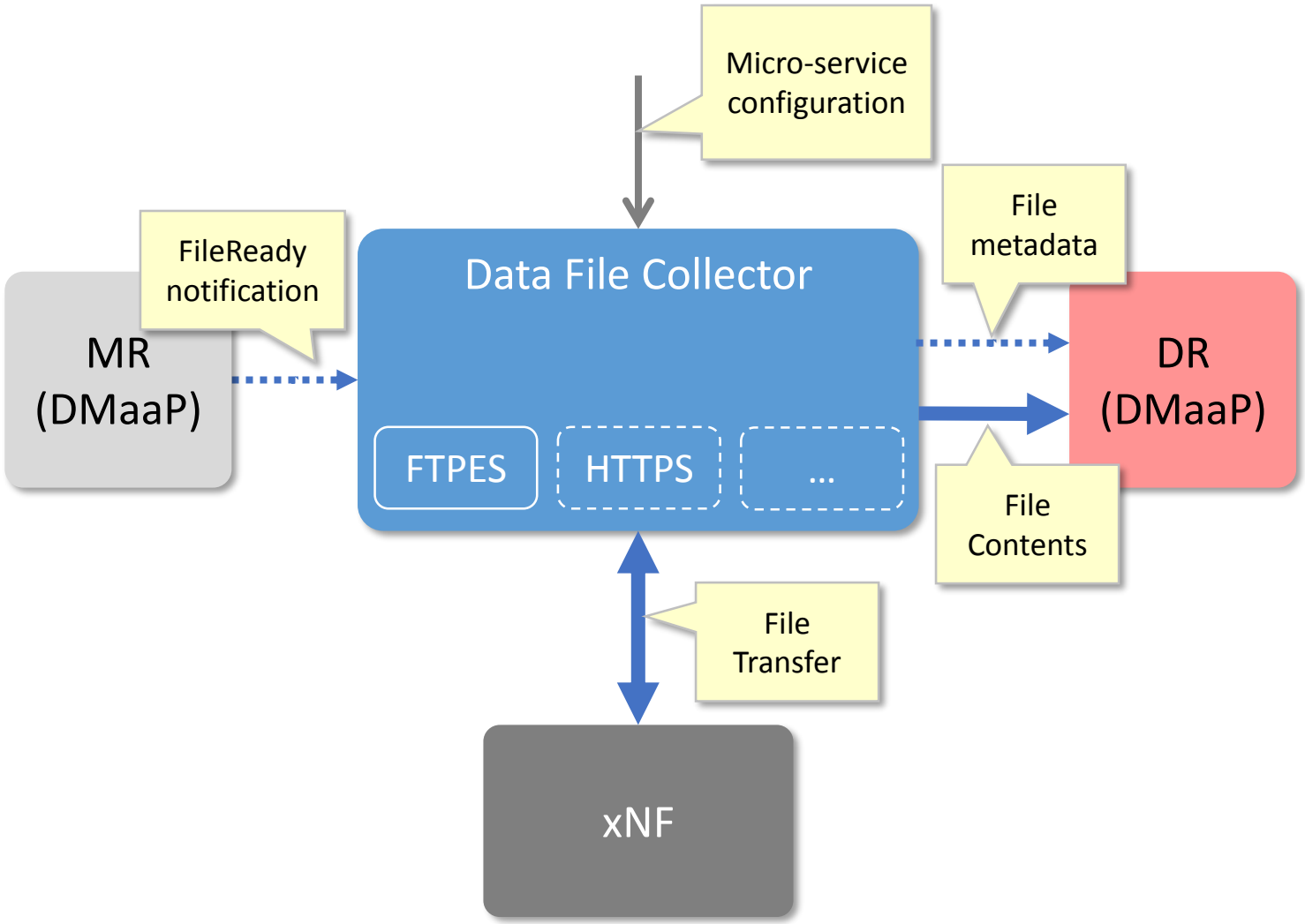


Preconditions

- At least one measurement job must have been configured on the xNF
  - Measurements are not automatically enabled
  - Job administration in first step (Casablanca) via vendor-specific configuration interface
- DCAE micro-services and DMaaP topics and feeds must have been deployed and configured
  - Aim to use SDC/DCAE-DS for design of monitoring blueprint

Data File Collector (UC1)

- The Data File Collector is a new DCAE micro-service
- Re-usable for different file types since file contents are not parsed
- Design planned to be extensible for multiple protocols such as FTPES and HTTPS
  - Both protocols require handling of TLS certificates
- A small number of micro-service instance parameters may be needed such as file type to handle and DR feed to publish on
- Metadata from the FileReady notification may be forwarded together with file contents on DR to support the next step of processing



FileReady Event, Common Header

Field	Type	Required?	Proposed value
Domain	string	Yes	'notification'
Eventid	string	Yes	Unique sequence number from xNF
eventName	string	Yes	'notification'+<vendor>+<xNF type>+<eventType>
lastEpochMicrosec	number	Yes	the latest unix time aka epoch time associated with the event […]
priority	string	Yes	Normal
reportingEntityName	string	Yes	Name of the entity reporting the event or detecting a problem in another vnf/vm or pnf which is experiencing the problem. […]
Sequence	integer	Yes	Ordering of events communicated by an event source instance (or 0 if not needed)
sourceName	string	Yes	Name of the entity experiencing the event issue, which may be detected and reported by a separate reporting entity. The sourceName identifies the device for which data is collected. A valid sourceName must be inventoried in A&AI. […]
startEpochMicrosec	number	Yes	the earliest unix time aka epoch time associated with the event from any component--as microseconds elapsed since 1 Jan 1970 not including leap seconds. […]
version	number	Yes	Version of the event header

Sample:

```
"commonEventHeader": {
    "domain": "notification",
    "eventId": "notification10001",
    "eventName": "notification_Eri_RnNode_FileReady",
    "lastEpochMicrosec": 8745745764578,
    "priority": "Normal",
    "reportingEntityName": "otenb5309",
    "sequence": 0,
    "sourceName": "oteNB5309",
    "startEpochMicrosec": 8745745764578,
    "version": 2
  }
```

FileReady Event, Notification Header

```
"notificationFields": {
    "notificationFieldsVersion": 1,
    "changeIdentifier": "PM_MEAS_FILES",
    "changeType": “FileReady",
    "arrayOfAdditionalFields": [
     {
       "location": "ftpes://192.168.0.101:22/ftp/rop/A20161224.1030-1045.bin.gz",
       "compression": "gzip",
       “fileformatType": "org.3GPP.32.435#measCollec",
       “fileFormatVersion": "V10"
     },{
       "location": "ftpes://192.168.0.101:22/ftp/rop/A20161224.1045-1100.bin.gz",
       "compression": "gzip",
       “fileFormatType": "org.3GPP.32.435#measCollec",
       “fileFormatVersion": "V10"
     }],
  }}}
```

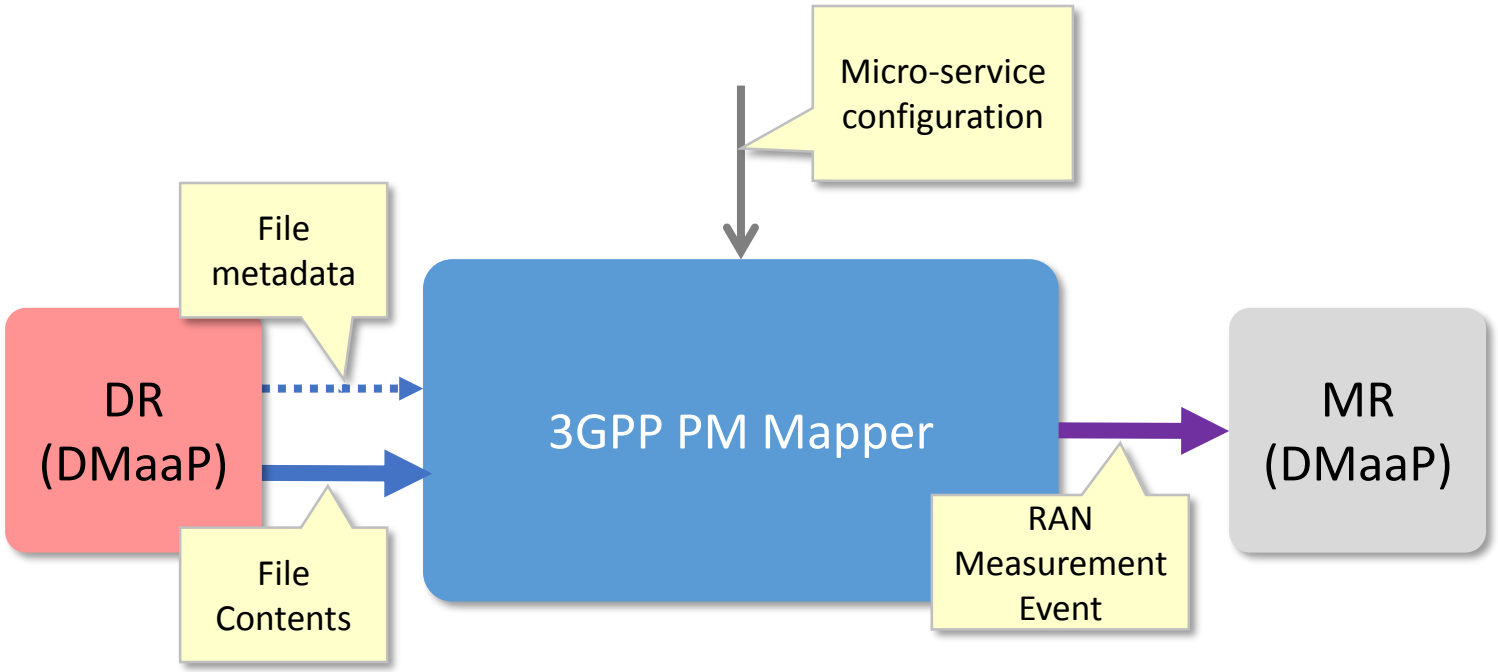
To be updated for alignment with latest draft VES specification

This list includes only new files that are available

(per TS 32.435)

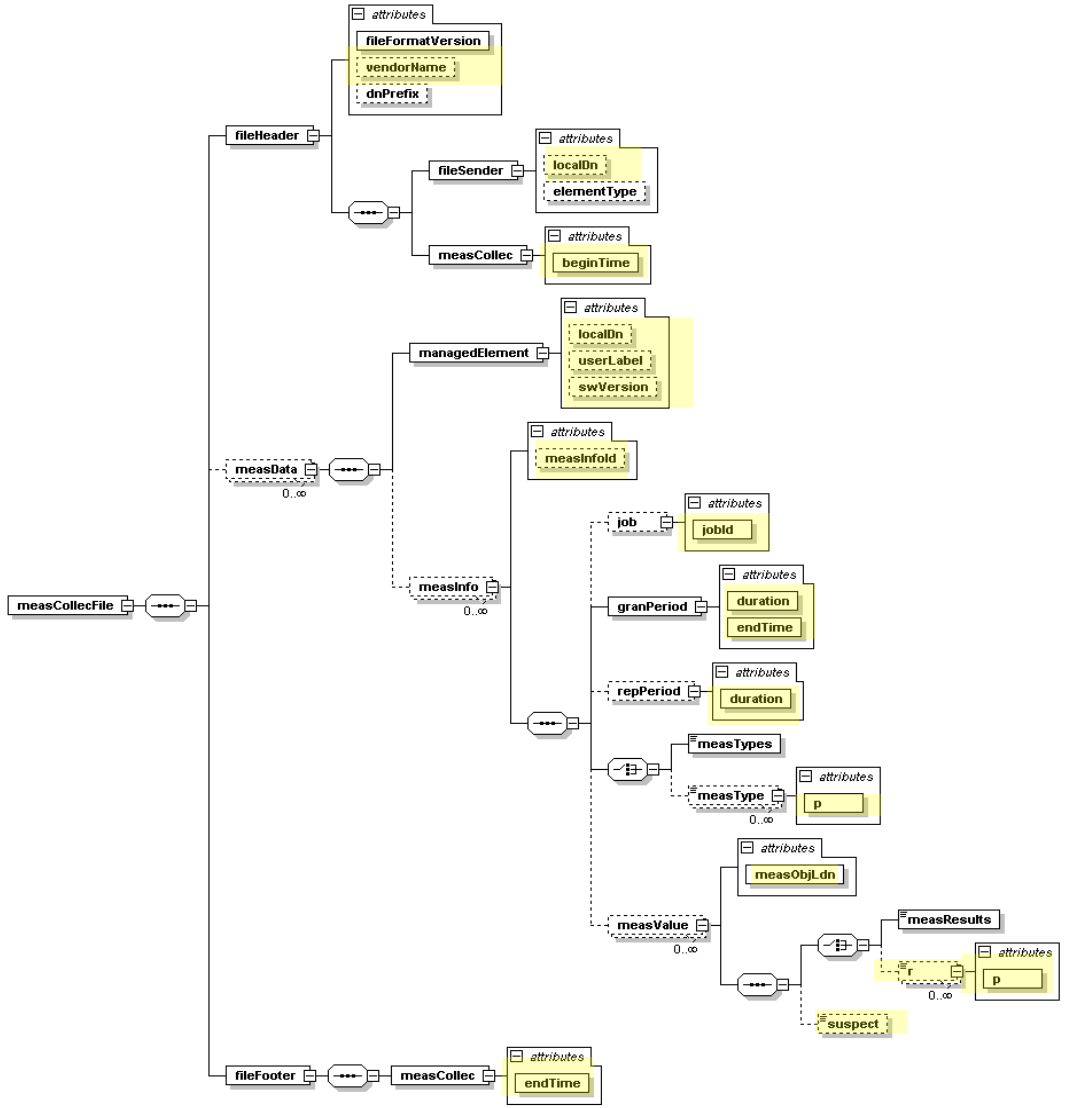
3GPP PM Mapper (UC2)

- The 3GPP PM Mapper is a new DCAE micro-service
- Defined to be used primarily with the file collector but can be configured to read from any DR feed
- Measurements are extracted from the file contents and a RAN Measurement VES event is generated and published on a DMaaP topic
- Micro-service instance parameters may include filters to extract only selected measurements from the file contents



PM Mapper Input and Output Formats

- The 3GPP PM Mapper accepts as input XML files formatted according to TS 32.435
- Measurements are extracted from the file, optionally filtered and converted to VES event
  - A new domain will be defined for RAN measurements and is currently under review



Solution Summary

- Modular approach for bulk PM reporting
- New DCAE micro-services
  - File Collector
  - 3GPP PM Mapper
- Will use new VES domains
  - Notification domain for ‘FileReady’ events
  - RAN Measurement domain for mapper output
- Other projects
  - DMaaP – Data Router
  - SDC – DCAE-DS

Thank You