



DCAE Data Files Collector

- Use Case 1: Data file collection and feed publication
- Use Case 2: 3GPP PM counters for closed loops

Ericsson Proposal

- June 6th, 2018

Performance Management

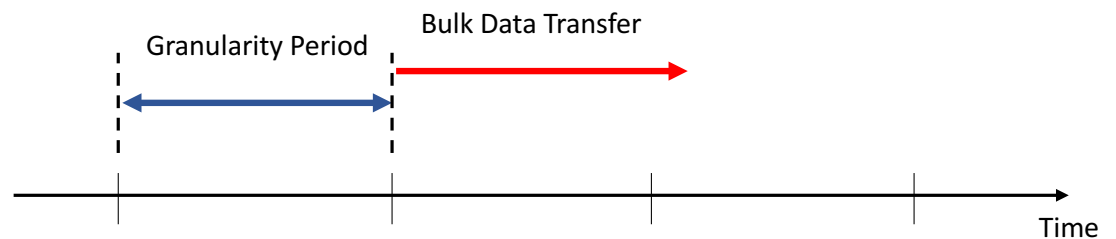
- Topics
 - PM Use Cases
 - Bulk PM Proposal

PM Use Cases

- **Bulk PM data transfer, suitable for non real-time PM use cases**
 - Configuration data at the xNF defines the content (e.g. which measurement types) and collection interval for each. This approach is suitable for large data volumes in support of non real-time PM use cases. The output is collected at the xNF and transferred to external consumers in bulk. Such bulk data is used for analysis such as KPI monitoring, and machine learning requiring large data sets collected over multiple collection periods.
- **PM event streaming, suitable for near real-time PM use cases**
 - This approach is suitable for xNF events intended for consumers requiring very large volumes of data, at the lowest possible latency. Such streams are often intended for specific consumers and produce data intended for specific purposes, e.g. RAN call summary logs.

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

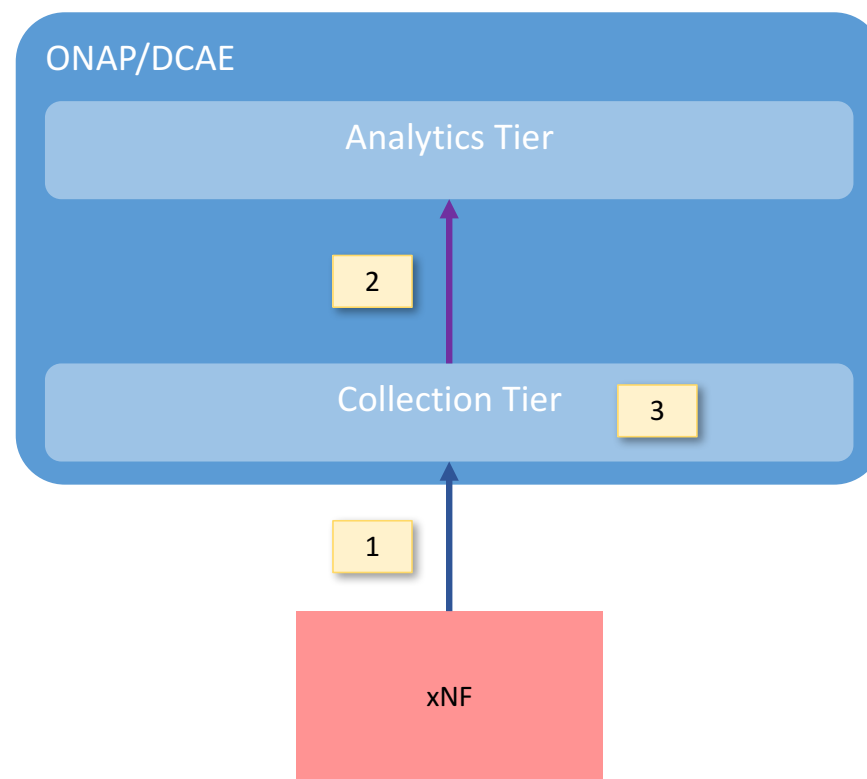
- Example for LTE (E-UTRAN)

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. <i>Cause</i> where <i>Cause</i> identifies the establishment cause.
Object Class (f)	EUtranCellFDD, EUtranCellTDD

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



Overview – Use Case proposal

- Request to introduce 2 new use cases in ONAP:
 - **UC1 – File Collection support in ONAP**, provides file based data collection from xNFs
 - **UC2 – 3GPP PM Data support in ONAP**, provides ONAP PM counter events from 3GPP bulk PM files
- Combined these provide ONAP support to collect bulk 3gpp PM data files from xNF for analytics use
 - extensible for future use cases which require collection of file based data from xNFs
 - extensible for future use cases requiring mapping of bulk data to VES events
- Requires 2 new micro-services:
 - **DCAE Data File Collector**: event triggered file collection from xNF, and publication to DMaaP Data Router
 - **DCAE 3GPP PM Mapper**: 3gpp counter data from DMaaP DR, parsed to create VES PM events on DMaaP MR
- Each use case includes the delivery of specific artifacts required for onboard, template, blueprint, and service instantiation.

Use Case 1: Overview, Data File Collector

- Request to introduce a new microservice to add 'Data File Collector' to DCAE for data file collection and distribution within DMaaP
 - provides collection of 3GPP bulk PM files and publishes to DMaaP Data Router '3GPP PM' feed
 - suitable for non real-time data collection, e.g. PM data files, logs, etc.
- DCAE 'Data File Collector' micro-service provides:
 - generic collection, agnostic to content of the files being collected
 - DMaaP DR feed publisher (*like VES Collector is for MR topics, Data File Collector is for DR feeds*)
 - collection triggered by VES notification for "FileReady"
 - which is a data driven, via self-descriptive event:
 - node to collect data from
 - collection protocol
 - which **NEW** data files to collect, i.e those which have not yet been sent in a previous notification
- Initial support for PM counter file 'pull' via ftpes from xNF
 - extensible for other file data collection in future
- Configuration of the PM data file collection, and "FileReady" notification at xNF is a prerequisite, not provided by the Data File Collector.

```
E.g. <protocol>://<ip address>:<port>/<path>/<filename> ->  
ftpes://192.168.0.101:22/ftp/rop/A20161224.1030-1045.bin.gz
```


Use Case 1: Description

- UC1: “DCAE Bulk Data File Collection and DMaaP DR Feed Publication”
 - Actor:
 - Producer xNF (file generator)
 - Consumer Application (file consumer)
 - “Data File Collector” service component
 - Artifacts:
 - component specification and policy modelling
 - data router feed
 - VES “FileReady” topic for VES listener
 - Prerequisites (Design and Service Instantiation phases):
 - Producer xNF configured to produce PM data files (*done outside of ONAP in Casablanca*)
 - Producer xNF configured to send VES ‘FileReady’ event
 - DCAE VES Collector configured to publish the “FileReady” event (*could be exact same event as sent originally from xNF*)
 - DCAE File Collector subscribed to the “FileReady” event
 - Consumer Application subscribed to specific ‘file feed’ from Data Router
 - Handling (Runtime phase):
 - 1. Producer xNF creates PM data file, and sends VES event indicating “FileReady” to *DCAE VES Collector*
 - 2. *DCAE VES Collector* sends “FileReady” to MR
 - 3. *DCAE File Collector* receives “FileReady” event
 - 4. *DCAE File Collector* collects file from xNF (based on data in “FileReady” that indicates file(s) to collect)
 - 5. upon completion, *DCAE File Collector* publishes data to *DMaaP Data Router*
 - 6. *DMaaP Data Router* sends file feed to Consumer xNF

Assumptions:

- DMaaP Data router is supported in ONAP

Use Case 1: Deliverables

- *Data File Collector* microservice on-boarding artifacts:
 - Component-spec for DCAE File Collector service component (JSON file)
 - DMaaP DR feed descriptor (JSON file)

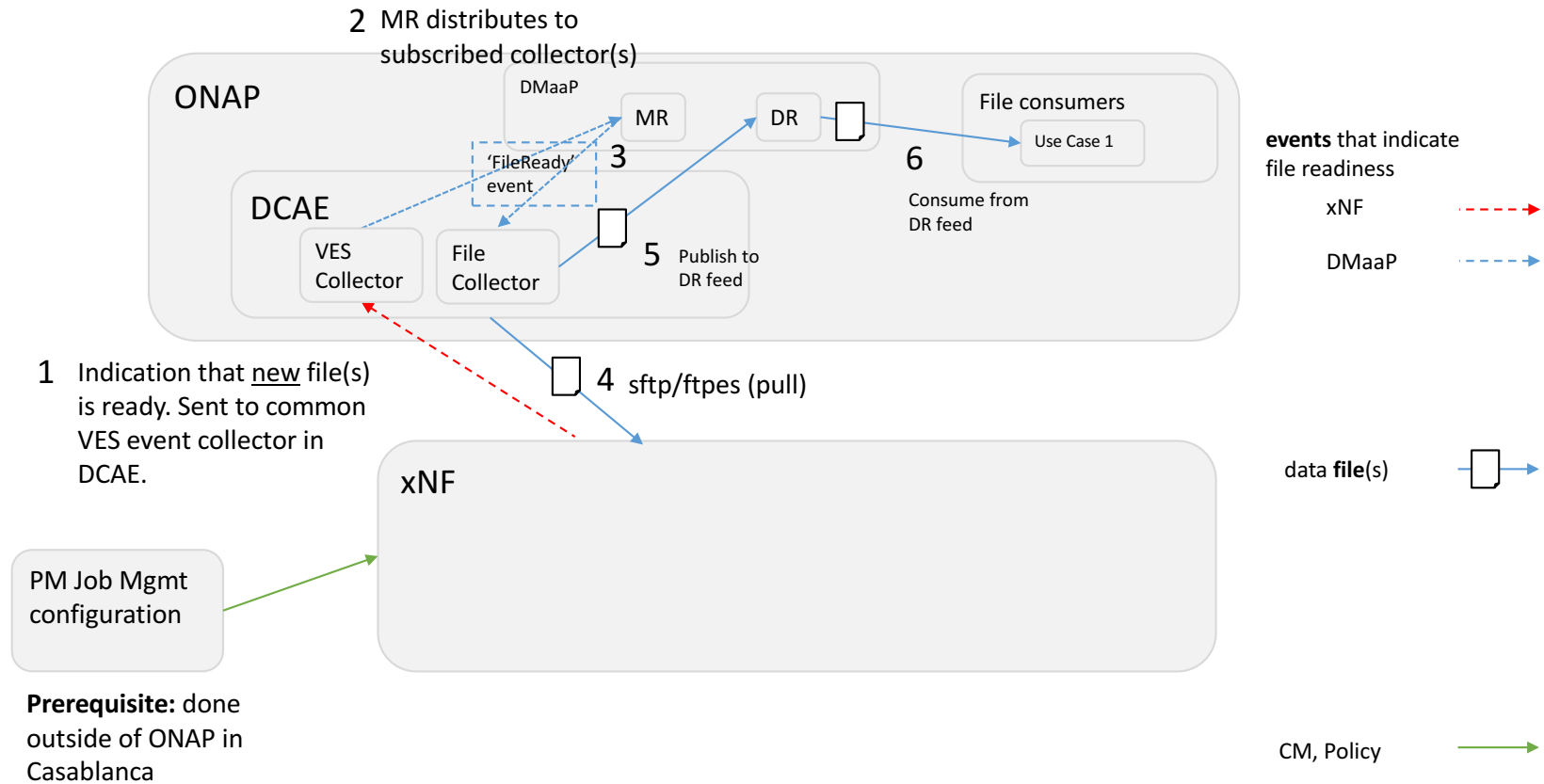
Above are used during Design-Phase to create *DCAE File Collector template* in SDC.

- Instantiation:
 - VES Event – “FileReady” (new event in ‘File Management’ domain)
 - Update: after discussion DCAE it was decided to use existing ‘Notification’ domain, not a new domain.

Assumptions:

- Different VES Collector instances, with configuration per xNF VES Agent to direct events to configured collector
- Casablanca will rely on external configuration of xNF to configure VES Agent. In future could be done by APPC during service instantiation, e.g. to configure specific PM event jobs on xNFs as needed for specific policies.

Use Case 1: Bulk data file collection



VES event – FileReady

- During DCAE review of ‘data file collector’ recommendation was Notification domain be used for VES ‘FileReady’ (formerly ‘fileExists’).
- Per section 4.2.4.1, the event could* be defined as follows:
 - (mandatory) domain=‘notification’
 - (mandatory, string) changelIdentifier = <System/session identifier – see comment slide14>
 - (mandatory, string) changeType = “FILE_READY”
 - (optional, hashmap) notificationFields: = plus list of available files (*)
- * two alternatives proposed, one using array list of additionalFields (slide 14), and one using additionalFields(slide 15)
- there are at least 2 other pieces of data needed for bulk data -> DR mapping. Could be in additionalFields, but might be beneficial to align for any bulk data destined for DMaaP DR:
 - Compression type: Compression format for the file contents. E.g. gzip, which is available in the filename. Propose this be included in the VES event.
 - Feed: identifier on DMaaP DR. E.g. ‘3GPP Performance Domain’ for bulk PM data). Propose this be configured in the Data File Collector.

VES event – common header (sample, FileReady)

Field	Type	Required?	Proposed value
Domain	string	Yes	'notification'
Eventid	string	Yes	Unique sequence number from xNF.
eventName	string	Yes	'Noti'+<xNF type>+<eventType>
lastEpochMicrosec	number	Yes	the latest unix time aka epoch time associated with the event [...]
priority	string	Yes	"
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": "10001",
  "eventName": "Noti_RnNode_FileReady",
  "lastEpochMicrosec": 8745745764578,
  "priority": "Normal",
  "reportingEntityName": "otenb5309",
  "sequence": 0,
  "sourceName": "oteNB5309",
  "startEpochMicrosec": 8745745764578,
  "version": 3.0
}
```

(plus vendor id preface)

Where:

- 'sourceName' is the xNF name used to enrol in A&AI
- 'reportingEntityName': the managed element/device reporting the event
- for PNF likely to be same value

VES event – notificationFields (sample, FileReady) – Alt1

Array of additional fields, 1 per available file:

```
"notificationFields": {  
  "changeIdentifier": "PM_MEAS_FILES",  
  "changeType": "FileReady",  
  "notificationFieldsVersion": 1.0  
  "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"  
    }  
  ]  
}
```

This option was selected in DCAE meeting, June 8th.

The notificationFields additionalFields will be updated (to arrayOfAdditionalFields) in VES specification.

(per TS 32.435)

Pro: Self descriptive, extensible, less work on collector to parse
Con: Less compact, requires update to VES spec

VES event – notificationFields (sample, FileReady) – Alt2

additional fields hashmap, 1 key-value pair per available file:

```
"notificationFields": {  
  "changeIdentifier": "PM_MEAS_FILES",  
  "changeType": "FILE_READY",  
  "notificationFieldsVersion": 1.0,  
  "additionalFields": {  
    "A20161224.1030-1045": "ftpes://192.168.1.100:22/ftp/rop/ A20161224.1045-1100.bin.gz, org.3GPP.32.435#measCollec,v10,gzip",  
    "A20161224.1045-1100": "ftpes://192.168.1.100:22/ftp/rop/ A20161224.1045-1100.bin.gz, org.3GPP.32.435#measCollec,v10,gzip"  
  },  
}
```

(Note: The value strings in the original image contain a question mark, likely indicating a missing or placeholder value.)

This option was NOT selected, DCAE meeting, June 8th.

Pro: Compact, less extensible, no VES spec update needed
Con: Collector must parse the value strings

Use Case 2: Overview, 3GPP PM Mapper

- Request to introduce a new microservice to add ‘3GPP PM mapper’ to DCAE
 - provides 3GPP PM measurements as VES events on DMaaP MR
 - suitable for non real-time closed loops using 3GPP measurement values
- Define new VES Event “Performance” domain
 - add new PM specific events and datatypes (per counter type) to VES Event Listener spec
- Deliver a “3GPP PM mapper” micro-service that produces ONAP PM Events from ‘3GPP PM’ feed
 - subscribes to 3GPP PM feed on DMaaP DR
 - extracts PM data from feed, converts to required ONAP VES PM events
 - publishes VES PM events to DMaaP MR
 - data driven, with support for:
 - PM schema, i.e. available xNF counters
 - which PM counters to map
- Depends on “DCAE File Collector” to collect 3gpp PM files from xNFs

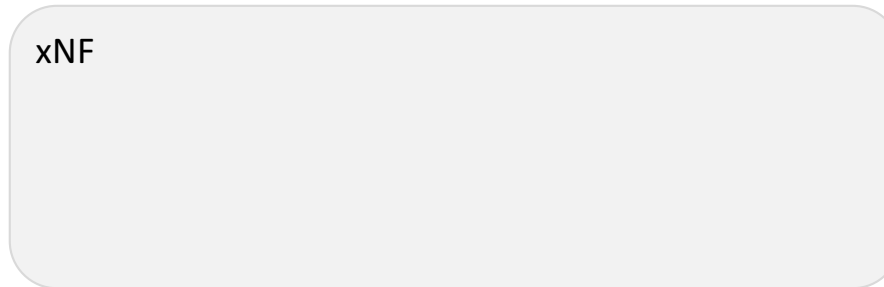
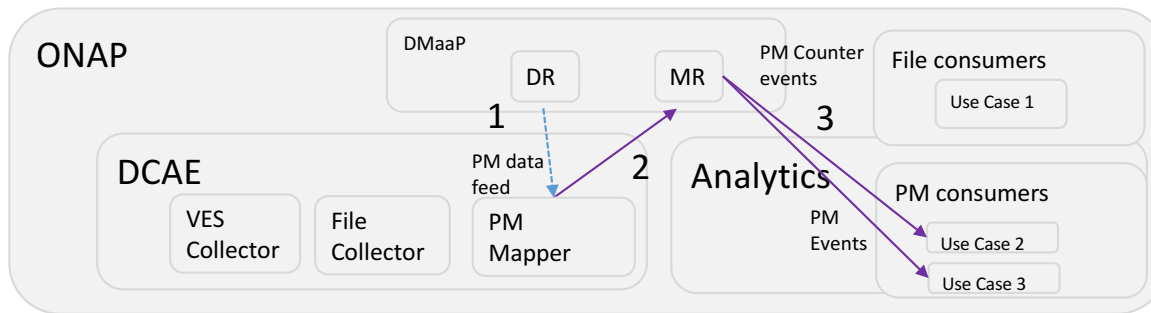
Use Case 2 Description

- UC2: 3GPP PM measurement events in ONAP
 - Actor:
 - “Data File Collector” service component
 - “3GPP PM Mapper” service component
 - Analytics Tier consumer, e.g. TCA
 - Artifacts:
 - PM mapper component specification
 - PM schema file with VES mappings for PM counter measurement types
 - policy modelling for which measurements to map
 - data router subscription
 - Prerequisites (Service Creation and Design Phases):
 - *DCAE 3GPP PM Mapper* subscribed to “3GPP PM file” feed from DMaaP Data Router
 - Closed Loop created such that TCA is subscribed to “3GPP PM Event” topic
 - Handling (Runtime phase):
 - 1. *DMaaP Data Router* sends file feed to *3GPP PM Mapper*
 - 2. *DCAE 3GPP PM Mapper* parses file data and publishes VES PM Events on DMAAP message router
 - 3. TCA receives subscribed VES PM Event(s) for CL topic of interest

Assumptions:

- DMaaP Data Router, configured and working in ONAP
- DCAE Data File Collector, configured and working in ONAP


Use Case 2: PM events from bulk files





events that indicate file readiness

xNF 

DMAaP 

PM events, req'd by consumers 

data file (s) 

data feed(s) 

Use Case 2 Deliverables

- *3GPP PM Mapper* microservice On-boarding artifacts:
 - Component-spec (JSON file) for *DCAE 3gpp PM Mapper* service component
 - DMaaP DR subscription descriptor (JSON file)

Above are used during Design-Phase to create *DCAE 3GPP Mapper template* in SDC.

- Service Creation:
 - VES Event Listener update – ‘performance’ domain (VES event spec new domain)
 - VES Event Listener update – ‘performance’ datatypes (VES event spec, new datatypes per PM counter type)

Assumptions:

- xNF on-boarding has delivered the *PM Measurement Schema* (e.g. *3GPP PM xsd*, which contains base *PM+VS* for xNF release)
- DMaaP Data Router dependency during SDC support the feed management

ONAP Project deliverables (DCAE)

- UC1 and UC2 deliverables will be delivered in DCAE R3 project
- Currently on the [DCAE R3 Casablanca planned features](#) list:
 - Flink
 - Prometheus
 - [Data File Collector](#)
 - [3GPP PM Mapper](#)

ONAP Project dependencies (outside DCAE)

- **DMaaP Data Router must be available in Casablanca release**
 - Functional dependencies:
 - UC1, requires DMaaP DR to create a PM feed, and publish the data files
 - UC2, requires DMaaP DR to subscribe to the PM feed, and retrieve the data files
 - API documentation used for initial planning of UC1
 - [DMaaP API](#)
 - API documentation and DR Demo have been used for assessments to date.
 - All required functionality is described.
 - AT&T is expected to submit their updated seed code to DMaaP R3 Casablanca
 - at which time further assessment of the integration and functionality can be done for UC1 design
 - DR is currently on DMaaP content planning page, but not committed to specific release
 - <https://wiki.onap.org/display/DW/DMaaP+Planning>
 - No Casablanca information/content yet available
 - Information:
 - DR Wiki: <https://wiki.onap.org/pages/viewpage.action?pageId=3247130>
 - DMaaP project planning: <https://wiki.onap.org/display/DW/DMaaP+Planning>
- **SDC is not expected to have any impacts**
 - but need to confirm that DS (Design Studio) capabilities in R3 will suffice for UC1 and UC2 delivery



ONAP

OPEN NETWORK AUTOMATION PLATFORM