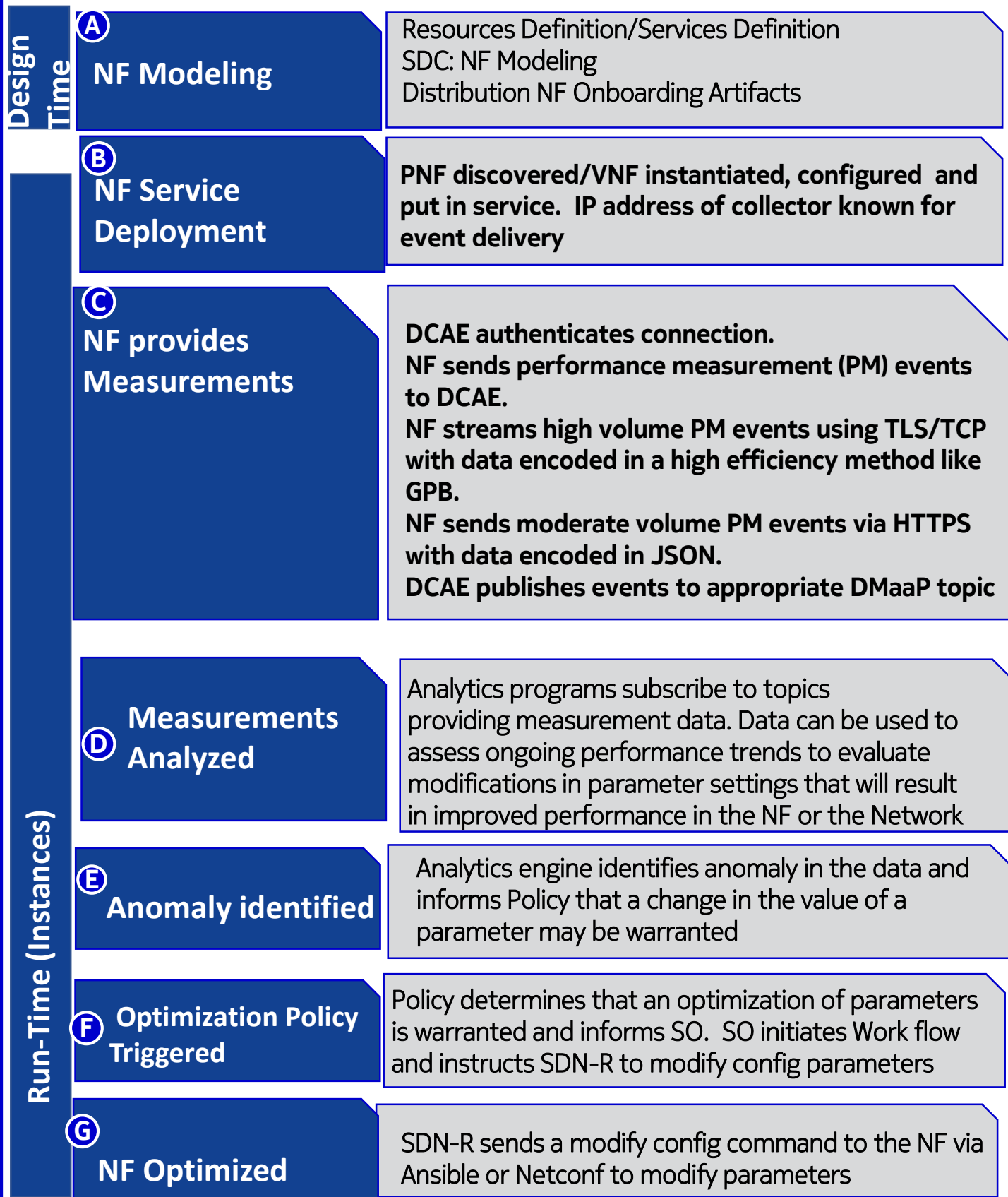




ONAP Data Collection and Optimization Use Case

- ONAP Data Collection enhancements to support Optimization
- 5G Use Case Team

Data Collection and Optimization Steps

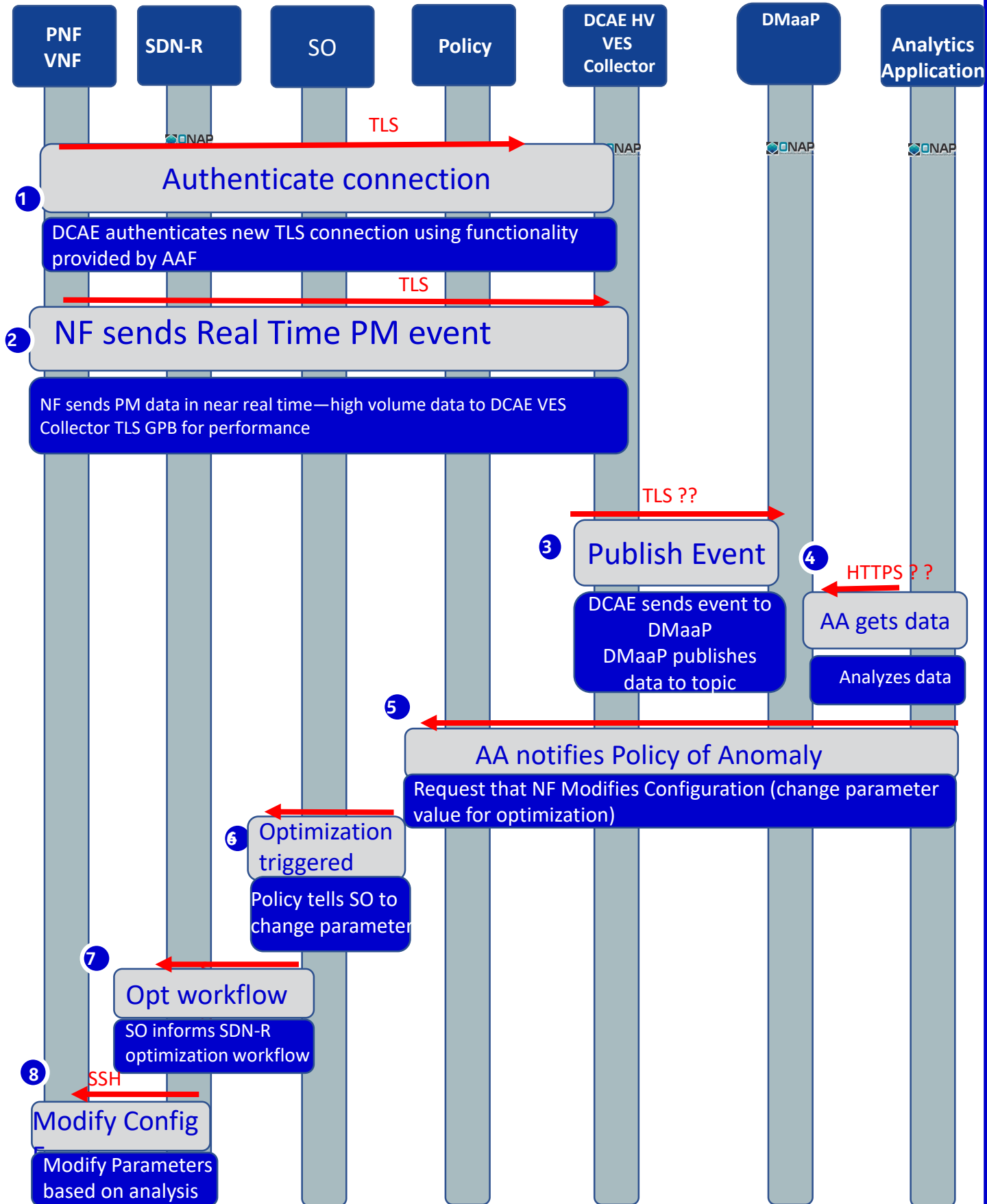


Data Collection and Optimization Issues

ONAP Area	Issue
DCAE: VES Events	<ul style="list-style-type: none">• Optimization functions will require many measurement input sources (traditional PM, near real time PM, Call Trace etc)• Current VES Events for Measurements are focused on Scaling.• 5G NF needs new VES event for traditional periodic counter delivery to ONAP—can follow REST/HTTPS/JSON format• 5G NF needs new VES event for high volume PM data such as real time PM and Call Trace. This requires an efficient, persistent streaming protocol and an efficient encoding method like GPB.
DCAE VES Collector	<ul style="list-style-type: none">• Current VES Collector only supports REST/HTTPs interface with JSON encoding• High Volume Data is more efficiently provided via other encoding mechanisms such as GPB• A new VES Collector will be required to support high volume data events and streaming protocols
AAF	<ul style="list-style-type: none">• DCAE needs AAF to provide the capability to authenticate connections(HTTPS and TLS) from NF
DMaaP	<ul style="list-style-type: none">• DMaaP currently only allows topics to publish via HTTPS with JSON encoding. DMaaP will need to publish to and allow subscription of topics that are not REST/HTTPS or we will have inefficiencies and protocol conversions within DMaaP• DMaaP is changing how topics are created.
Policy	<ul style="list-style-type: none">• Policy for addressing anomalies found from the analytics application are required
SO	<ul style="list-style-type: none">• New SO flow to implement policy change based on Policy result
SDN-R	<ul style="list-style-type: none">• SDN-R must set up SSH connection to the NFs to ensure secure communication to modify configurations• SDN-R must support approved configuration interfaces (Ansible, Chef, NetConf)

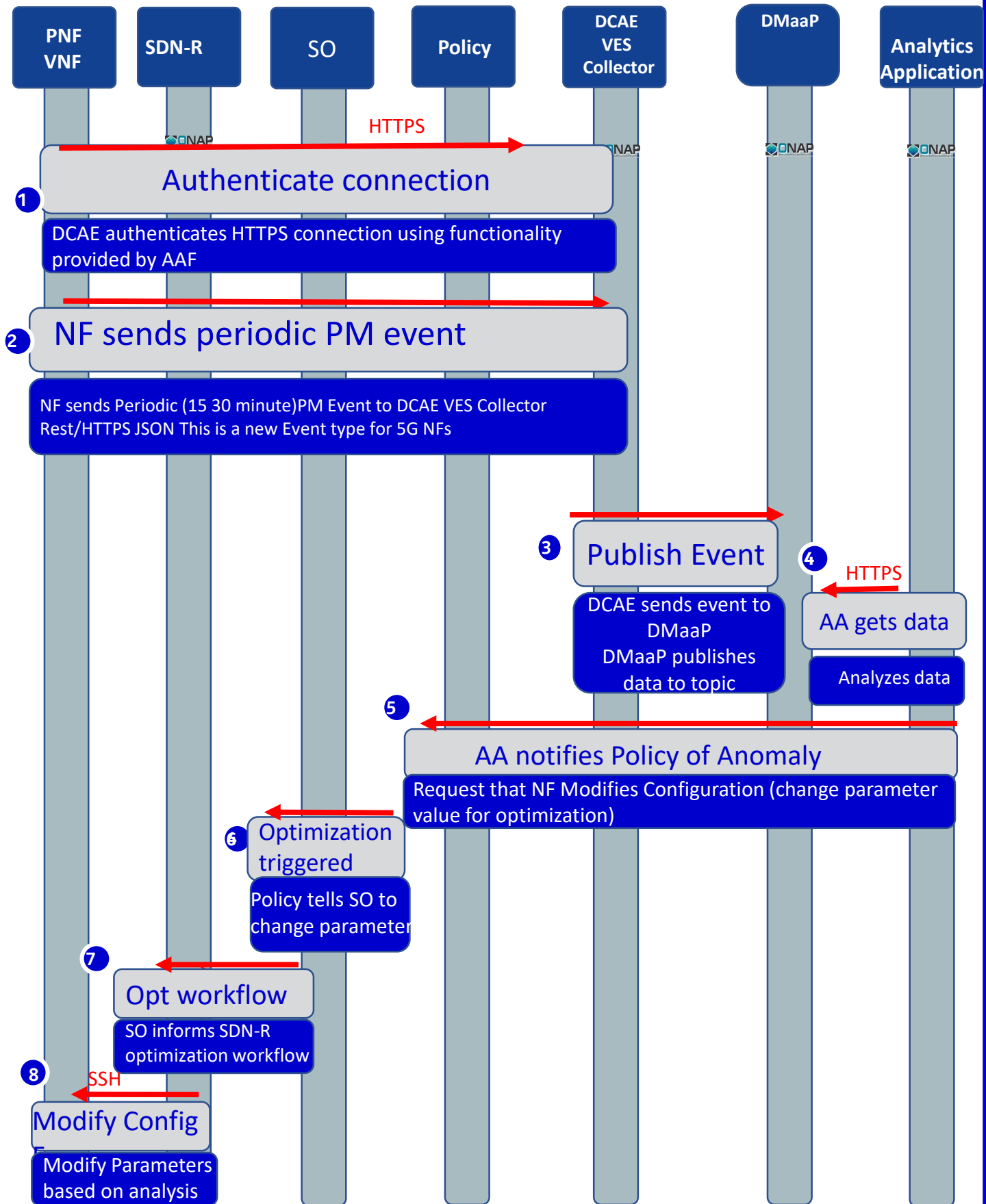
ACTORS	DESCRIPTION
NF	NETWORK FUNCTION (NF) – The Distributed Unit (DU) is an example of a PNF providing a 5G NF and the Centralized Unit (CU) is an example of a virtualized Network function (VNF) . In this deck NF means a 5G NF either a PNF or a VNF.
DMaaP	Data Movement as a Platform (DMaaP) -DMaaP has four components : 1)message router (built over Kafka), 2)Data Router which provides a common framework by which data producers can make data available to data consumers. 3) Data movement director which provides a platform to subscribe and publish data and 4) Data Bus Controller is a provisioning API on the Data Movement Platform
AA	Analytics Application (AA) Application that subscribes to DMaaP topics with the purpose of analyzing NF performance metrics and identifying anomalies that require policy changes such as modifying parameters for improved performance.
JSON	JSON - JSON is an encoding and schema that is human readable. It is the current defined encoding and schema to be used for all events sent to DCAE and is transported via REST/HTTPS
GPB	GPB -Google Protocol Buffers is an encoding and schema that efficiently transmits high volume data in binary format and is transported over TCP or TLS
VES Collector	VES Collector - Component in DCAE that listens for events from NFs. Every encoding mechanism (JSON, GPB) requires its own VES Collector type .
DCA&E	DATA COLLECTION, ANALYTICS AND EVENTS (DCAE) – Gathers performance, usage, and configuration data from the managed environment. Collect, store data and provides a basis for analytics within ONAP.
Policy	Policy – The project in ONAP that will determine based on data received whether corrective actions are required.
SO	SERVICE ORCHESTRATOR – Serves as a mediator and coordinator of service requests.
SDN-R	SDN-R - Controller for Mobility Network functions. Capable of managing PNFs and VNFS Layer 1 to 7 to manage life cycle and support configuration updates, SDN-R inherits capabilities from APP-C and SDN-C
APP-C	APPLICATION CONTROLLER (APP-C) - A controller for Layer 4 to 7 applications. Manages the life cycle of virtual applications, virtual network functions (VNFs), and components.
SDN-C	SOFTWARE DEFINED NETWORK CONTROLLER (SDN-C) – A controller for Layer 0 to 3 devices. Manages transport and network connections.

Real Time PM and NF Optimization



STEP	DESCRIPTION
1	<p>DCAE Authentication DCAE uses AAF provided functionality (Casablanca item) and authenticates the Initial TLS Connection. Connection remains established while real time data enabled STRONGLY RECOMMEND THAT THIS BE PUT IN PLACE IN CASABLANCA</p>
2	<p>DCAE HV VES Collector receives event Given a different transport and encoding is used, a new HV collector needs to be created to support the new event. NF will continue to send the data to VES in near real time as configured. Because the connection is persistent authentication is not required for subsequent deliveries VERY IMPORTANT FOR CASABLANCA IF ONAP EXPECTS TO SUPPORT STREAMING DATA. IF RT PM AND TRACE ARE DEFERRED THEN THIS IS NOT REQUIRED</p>
3	<p>DMaaP Publishes Event DMaaP should be modified to not require HTTP wrapper and to expose native Kafka interfaces. It would be very inefficient to decode the GPB event and convert to JSON format which would currently be required-- performance hit THIS IS NECESSARY IF ITEM 2 IS SUPPORTED. THE INEFFICIENCY OF HAVING TO DECODE AND REFORMAT THE EVENT WITHIN DMAAP TO SIMPLY PUBLISH IT IS QUITE HIGH.</p>
4	<p>AA subscribes to data and analyzes data from topic it subscribes to. This could be the same AA application as is used to analyze real time PM data or a different one. RECOMMEND SIMPLE SUBSCRIPTION AND A VERY MODEST ANALYSIS ALGORITHM</p>
5	<p>AA detects an Anomaly During analysis of the data it is determined that a modification of a parameter is expected to improve the performance of the NF or the network. AA must inform the Policy engine that it has detected an anomaly THIS IS VERY COMPLEX AND INTERACTS WITH POLICY—THINK THAT THIS IS NOT FEASIBLE FOR CASABLANCA</p>
6	<p>Policy determines a parameter should be changed Policy determines that the anomaly reported by AA requires a parameter change for one or more parameters on the NF to improve performance Policy informs SO that a workflow should be initiated to modify a parameter THIS IS A VERY COMPLEX TOPIC DO NOT BELIEVE WE WILL BE ABLE TO SIGNIFICANTLY PROGRESS THIS IN CASABLANCA. AT BEST RECOMMEND A SIMPLE USE CASE TO DEMONSTRATE FEASIBILITY IN CASABLANCA</p>
7	<p>SO Workflow initiated— SO determines that the SDN-R is the controller that is associated with this NF and informs SDN-R to initiate a modify config to change the parameter values</p>
8	<p>SDN-R requests NF modify parameter— SDN-R sends Modify Config request to NF via NetConf or Ansible via SSH to modify these parameters CRITICAL FOR CASABLANCA IF 5G NES TO BE CONTROLLED BY SDN-R</p>

Measurements Collection and NF Optimization



STEP	DESCRIPTION
1	<p>DCAE Authentication DCAE uses AAF provided functionality (Casablanca item) and authenticates the TLS and HTTP Connection. Connection remains established while real time data enabled STRONGLY RECOMMEND THAT THIS BE PUT IN PLACE IN CASABLANCA</p>
2	<p>DCAE VES Collector receives event New 5G Measurements event is received by DCAE. This event is for the transmission of periodic 15 minute/30 minute data and is considered to be a medium volume event. It will use the REST/HTTPS for transmission and therefore can be sent to the existing VES collector. This event could be defined to contain the entire 15/30 minute report or it could provide an indication to ONAP that the data is ready to be collected. In the slides the former is presented. Perhaps ONAP should support both alternatives depending on the size of the data to be collected. CRITICAL FOR CASABLANCA TO HAVE DEFINED EVENT(S) FOR 5G NF TO SEND PERIODIC PM REPORTS TO ONAP</p>
3	<p>DMaaP Publishes Event DMaaP will publish the event to the appropriate topic. The existing HTTPS wrapper could be used as this data will be REST/HTTPS and JSON encoded. CRITICAL FOR CASABLANCA TO PUBLISH AND SUBSCRIBE DATA AS EFFICIENTLY AS POSSIBLE.</p>
4	<p>AA subscribes to data and analyzes data from topic it subscribes to. This could be the same AA application as is used to analyze real time PM data or a different one. RECOMMEND SIMPLE SUBSCRIPTION AND A VERY MODEST ANALYSIS ALGORITHM</p>
5	<p>AA detects an Anomaly During analysis of the data it is determined that a modification of a parameter is expected to improve the performance of the NF or the network. AA must inform the Policy engine that it has detected an anomaly THIS IS VERY COMPLEX AND INTERACTS WITH POLICY—THINK THAT THIS IS NOT FEASIBLE FOR CASABLANCA</p>
6	<p>Policy determines a parameter should be changed Policy determines that the anomaly reported by AA requires a parameter change for one or more parameters on the NF to improve performance Policy informs SO that a workflow should be initiated to modify a parameter THIS IS A VERY COMPLEX TOPIC DO NOT BELIEVE WE WILL BE ABLE TO SIGNIFICANTLY PROGRESS THIS IN CASABLANCA. AT BEST RECOMMEND A SIMPLE USE CASE TO DEMONSTRATE FEASIBILITY IN CASABLANCA</p>
7	<p>SO Workflow initiated— SO determines that the SDN-R is the controller that is associated with this NF and informs SDN-R to initiate a modify config to change the parameter values</p>
8	<p>SDN-R requests NF modify parameter— SDN-R sends Modify Config request to NF via NetConf or Ansible via SSH to modify these parameters CRITICAL FOR CASABLANCA IF 5G NES TO BE CONTROLLED BY SDN-R</p>



Optimization Use Case Enhancements Project Impacts and Open Points

- 5G Use Case Team

Optimization Use Case Enhancement impacts For recommended Casablanca actions

ONAP Project	IMPACT
Modeling, SDC, VNF-SDK	<ul style="list-style-type: none"> • Need a way to onboard a PM Dictionary • Modeling concerns for general PNF covered in PNP enhancements.
SDN-R Controller	<ul style="list-style-type: none"> • Ensure that SDN-R newly defined ONAP controller supports Ansible and NetConf for configuration change requests • Ensure that SDN-R supports SSH communication to the NFs
VNF Requirements	<ul style="list-style-type: none"> • Expand requirements to identify changes for high volume data events and the specific Registration and 5G PM events added in Casablanca
DMaaP	<ul style="list-style-type: none"> • Support High Volume data event publication and subscription --GPB encoding over TLS. This means that we would not use the existing HTTP wrapper around Kafka or would have a parallel Kafka bus perhaps.— see open points • Support publication and subscription for 5G PM Event
DCAE	<ul style="list-style-type: none"> • Define_new HV PM Data VES event • Implement new HV VES Collector • Define new PM Periodic VES EVENT—see Open Points • Provide Authentication for connections
AAF	<ul style="list-style-type: none"> • Authentication capabilities on AAF backlog critical to Casablanca to authenticate connections from NF to DCAE
Next Steps	

OPEN POINTS

<u>Topics</u>	<ul style="list-style-type: none">• Do all topics have to be converted to REST/HTTPs/JSON encoding—can DMaaP support multiple formats for topics—if not this will be very inefficient and may lead to a bypass of DMaaP or an alternative implementation for HV events.• The current polling that subscribers of topics are required to do rather than being notified does not seem practical especially for streaming applications.
<u>SDN-R</u>	<ul style="list-style-type: none">• Does SDN-R support SO workflows• Does MNFC have SSH support to the NFs?• Does MNFC support Ansible and Chef
<u>DCAE PROJECT</u>	<ul style="list-style-type: none">• Need to agree on VES event format for 5G PM event (REST/HTTPs) Nokia/ATT to propose to community• Need to agree on new HV event format Nokia/ATT to propose to community• Does DCAE have to create new Authentication capabilities or can they use the Authentication tools being created in AAF/Security subcommittee?• New Collector needs to be developed• How well does the collector scale and how many ports/persistent connections can be supported?• Can the VES collector process 15/30 minute PM data efficiently or will this severely impact performance of the collector and an alternative method be required (something like a notification that PM data is ready to pull from a NF)• If the 15/30 minute performance data is stored as a topic it is possible that applications may want to filter that data and republish the subset of interest to a different topic. Will DMaaP allow this in Casablanca?• DMaaP will need to be modified after open points resolved—do we have sufficient resources to support needed modifications?
<u>POLICY</u>	<ul style="list-style-type: none">• Policy framework needed for optimization is very sophisticated and does not seem to be in place at this time. Should an architecture for this be envisioned as part of the Casablanca activities even if implementation is not feasible?
<u>ANALYTICS APPLICATION</u>	<ul style="list-style-type: none">• Not sure how the analytics application works. It seems like we also need to be able to support applications/microservices outside ONAP to subscribe to data. Is this supported? How is the application authenticated?