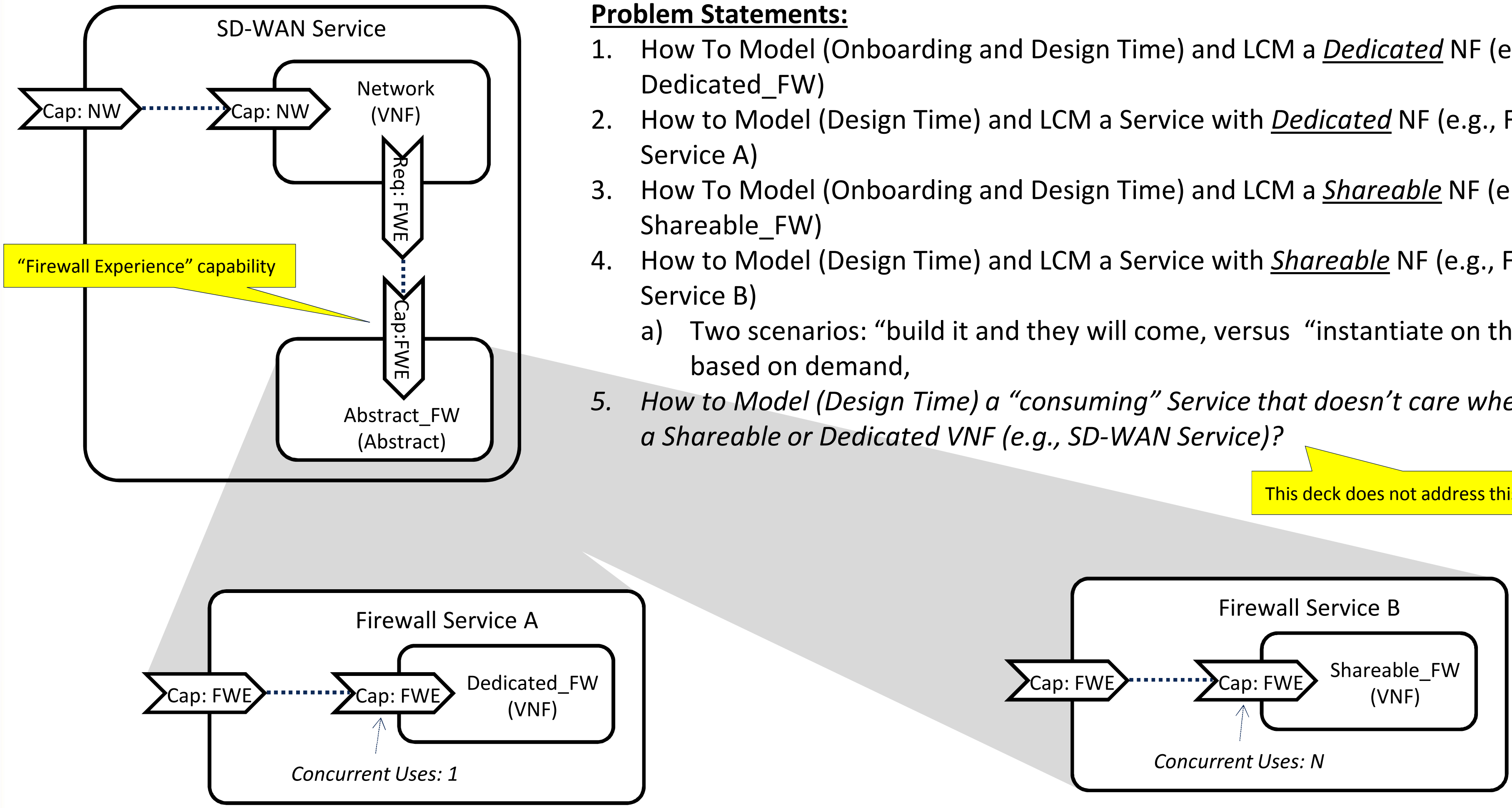
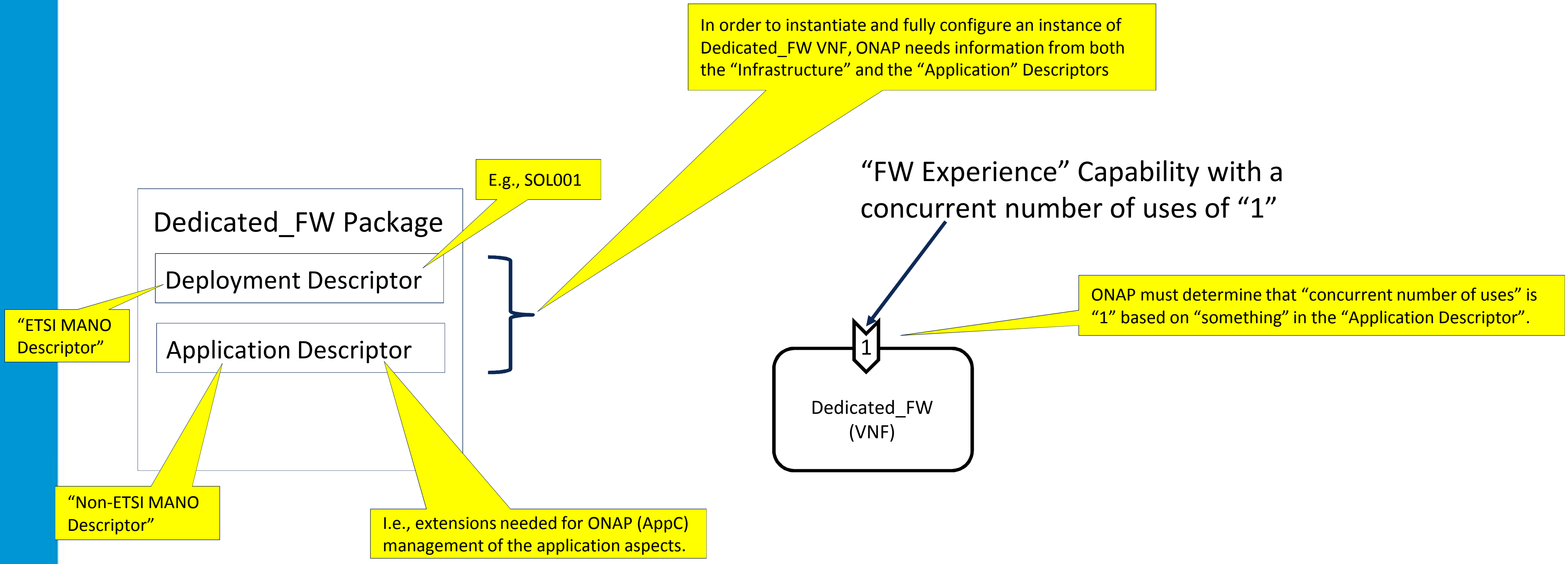


<u>Problem Statements:</u>

1. How To Model (Onboarding and Design Time) and LCM a ***<u>Dedicated</u>*** NF (e.g., Dedicated_FW)
2. How to Model (Design Time) and LCM a Service with ***<u>Dedicated</u>*** NF (e.g., Firewall Service A)
3. How To Model (Onboarding and Design Time) and LCM a ***<u>Shareable</u>*** NF (e.g., Shareable_FW)
4. How to Model (Design Time) and LCM a Service with ***<u>Shareable</u>*** NF (e.g., Firewall Service B)
   a) Two scenarios: "build it and they will come, versus "instantiate on the fly" based on demand,
5. *How to Model (Design Time) a "consuming" Service that doesn't care whether it gets a Shareable or Dedicated VNF (e.g., SD-WAN Service)?*

This deck does not address this question

Problem Statement 1: Onboarding a “Dedicated VNF”



In order to instantiate and fully configure an instance of Dedicated_FW VNF, ONAP needs information from both the “Infrastructure” and the “Application” Descriptors

E.g., SOL001

Dedicated_FW Package

Deployment Descriptor

Application Descriptor

“ETSI MANO Descriptor”

“Non-ETSI MANO Descriptor”

I.e., extensions needed for ONAP (AppC) management of the application aspects.

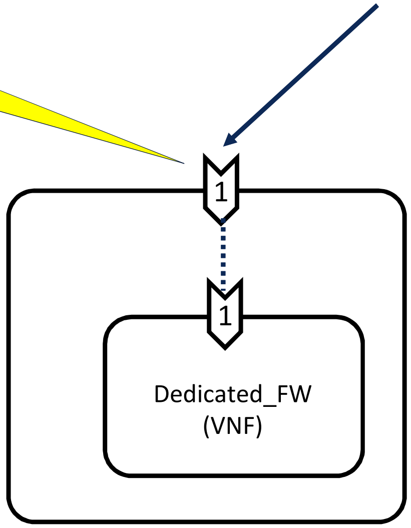
“FW Experience” Capability with a concurrent number of uses of “1”

ONAP must determine that “concurrent number of uses” is “1” based on “something” in the “Application Descriptor”.

Problem statement 2: Modeling a Service Containing a Dedicated VNF

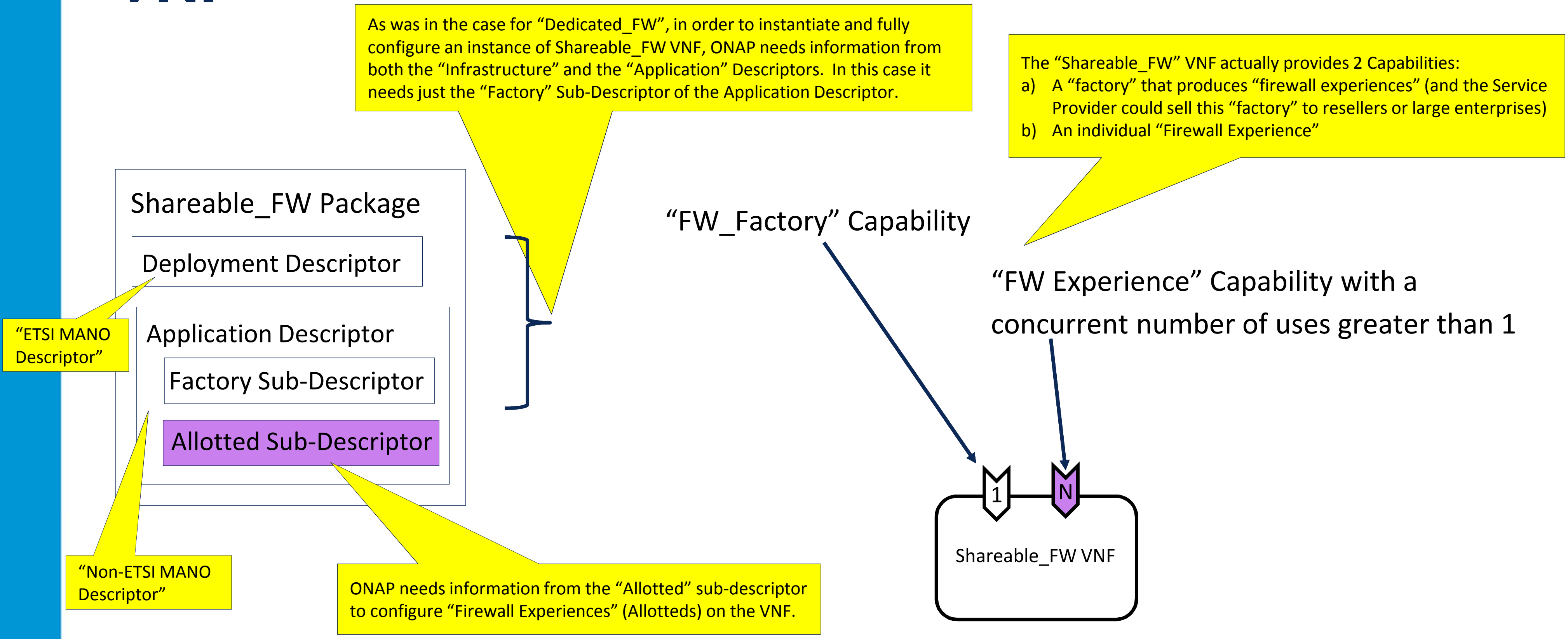
“FW Experience” Capability is also exposed at the Service level with a concurrent number of uses of “1”

The “concurrent number of uses” exposed by the Service need not be the same as the “concurrent number of uses” of any of the VNFs.



Firewall Service A
Service Topology Template

Problem Statement 3: Onboarding a “Shareable VNF”



As was in the case for “Dedicated_FW”, in order to instantiate and fully configure an instance of Shareable_FW VNF, ONAP needs information from both the “Infrastructure” and the “Application” Descriptors. In this case it needs just the “Factory” Sub-Descriptor of the Application Descriptor.

The “Shareable_FW” VNF actually provides 2 Capabilities:

a) A “factory” that produces “firewall experiences” (and the Service Provider could sell this “factory” to resellers or large enterprises)

b) An individual “Firewall Experience”

Shareable_FW Package

Deployment Descriptor

Application Descriptor

Factory Sub-Descriptor

Allotted Sub-Descriptor

“ETSI MANO Descriptor”

“Non-ETSI MANO Descriptor”

“FW_Factory” Capability

“FW Experience” Capability with a concurrent number of uses greater than 1

1

N

Shareable_FW VNF

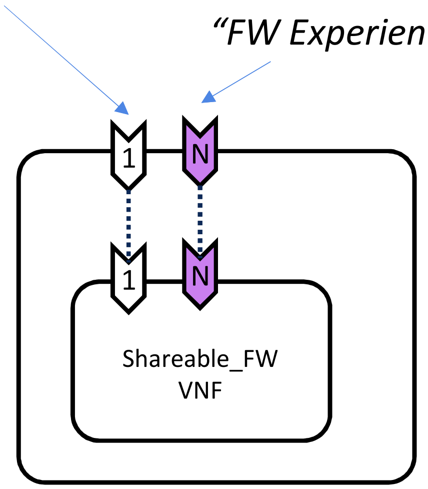
ONAP needs information from the “Allotted” sub-descriptor to configure “Firewall Experiences” (Allotteds) on the VNF.

Problem Statement 4: Modeling a Service Containing a Shared VNF: Option A

Option A: Wrap Shareable_FW in a single Service that exposes both the “FW_Factory” and the “FW Experience” capabilities.

“FW_Factory” Capability

“FW Experience” Capability



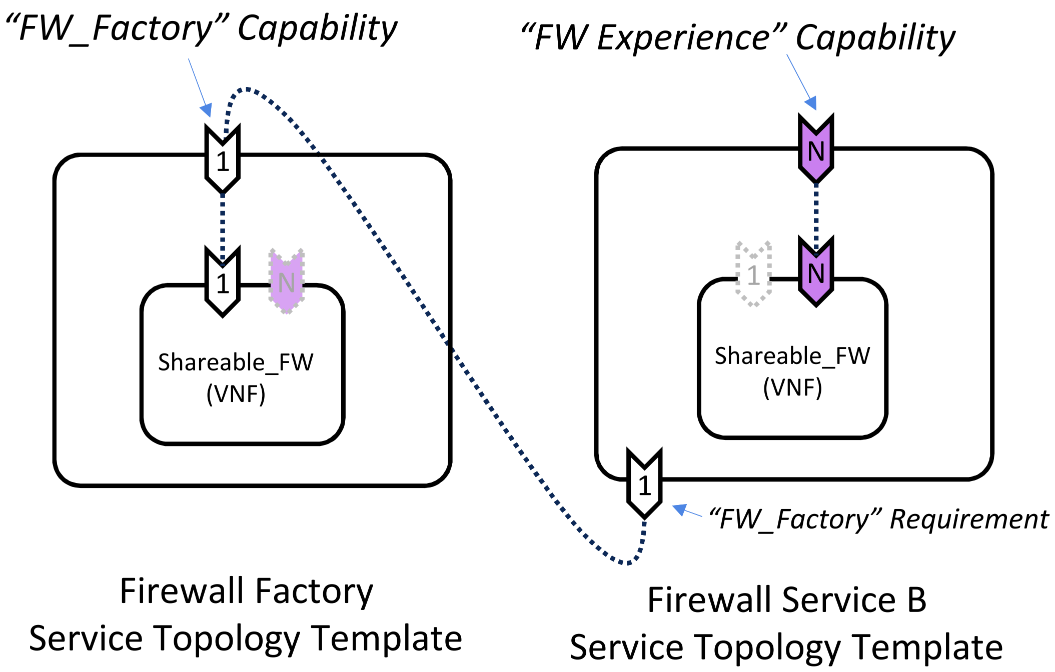
Firewall Service B
Service Topology Template

Observations:

- Requires that the external-to-ONAP requestor ask for a specific “capability”; can no longer simply request a (SDC) “Service”
- ONAP OOF needs to understand the instance relationship across these capabilities. I.e., when creating an instance of “FW Experience” capability, which instance(s) of “Shareable_FW” *VNF* can be used? This includes “owner” aspects as well as geographical.
- The two capabilities that Firewall Service A exposes are quite different from each other, and it seems “unnatural” to combine them into a single “Service”.
- This would be akin to putting “I want a car” and “I want a pizza” in the same Service, and the person placing the order has to specify which they want.
- Such an approach could also get quite complex if there were other VNFs in Firewall Service A, one set which supported this Service in providing its “FW_Factory” capability and another set which supported this Service in its “FW Experience” capability.

Problem Statement 4: Modeling a Service Containing a Shared VNF: Option B

Option B: Wrap Shareable_FW in two separate Services, one of which exposes only the "FW_Factory" capability and the other which exposes only the "FW Experience" capability

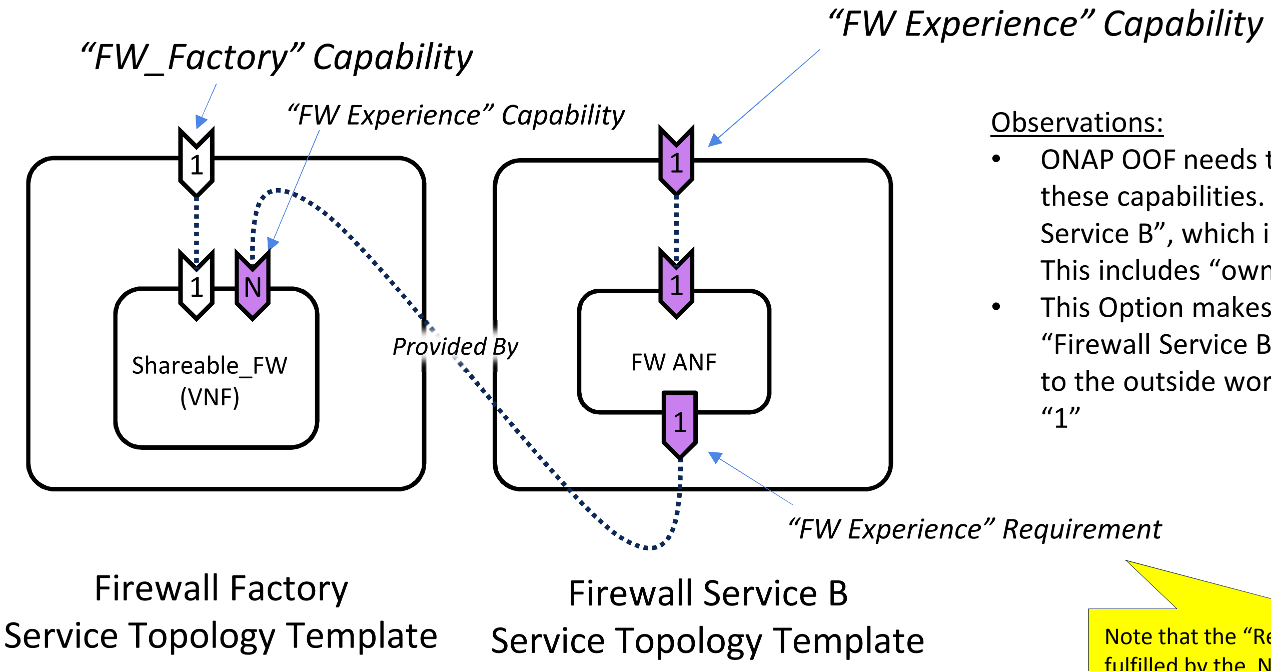


Observations:

- ONAP OOF needs to understand the instance relationship across these capabilities. I.e., when creating an instance of "Firewall Service B", which instance(s) of "Firewall Factory" *Service* can be used? This includes "owner" aspects as well as geographical.
- Thinking back to slide 1, "SD-WAN Service" will know that Firewall Service A has a concurrent number of uses value of "1", whereas Firewall Service B has a concurrent number of uses value of "N".
- Is exposing the fact that "Firewall Service B" can support a concurrent number of uses value of "N" exposing "too much information"?
- Imagine that "Firewall Service B" were offered by Service Provider X, and "SD-WAN Service" (from slide 1) were offered by Service Provider Y. Would Service Provider X have a business reason to expose their Service as having concurrent number of uses "N"?
- I.e., does a concurrent number of uses of "N" mean that the Service Designer is implicitly exposing the shared, or otherwise, nature of the firewall contained therein"

Problem Statement 4: Modeling a Service Containing a Shared VNF: Option C

Option C: We could model a Resource Type referred to as an "Allotted Network Function" (ANF) that represents a single "use" of an underlying Resource. The ANF would support a concurrent number of uses value of "1", having a relationship to the "Shareable_FW" VNF.

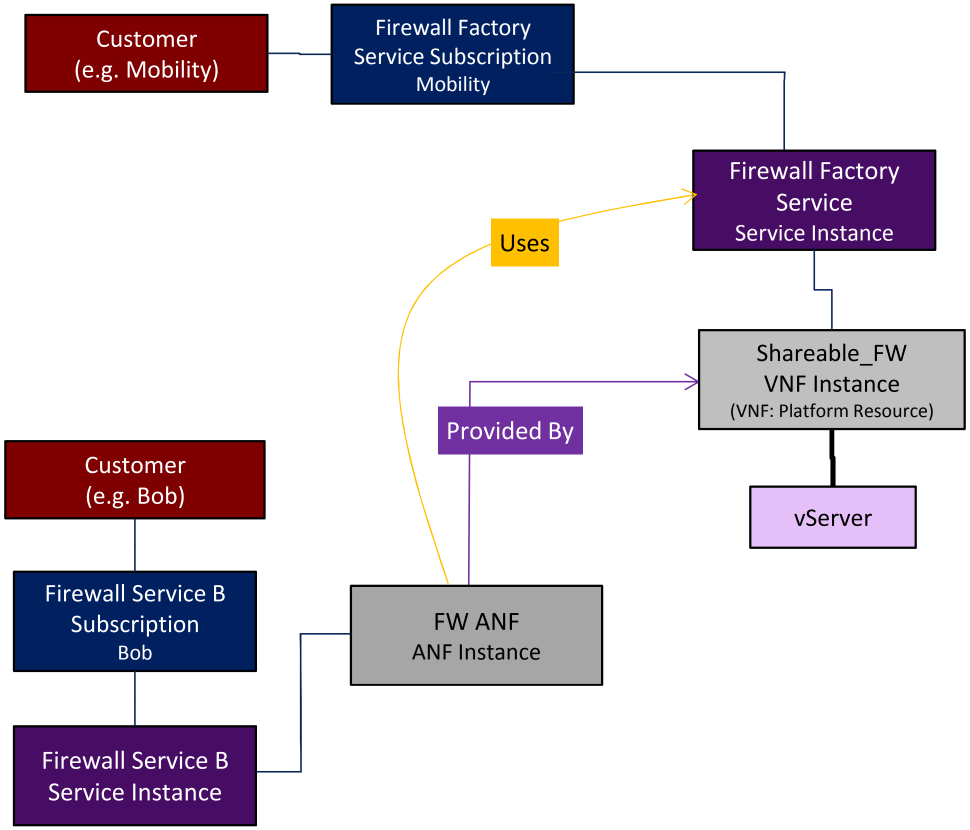

"FW Experience" Capability
"FW_Factory" Capability
"FW Experience" Capability
1
1
N
Shareable_FW
(VNF)
Provided By
1
1
FW ANF
1
"FW Experience" Requirement
Firewall Factory
Service Topology Template
Firewall Service B
Service Topology Template

Observations:

- ONAP OOF needs to understand the instance relationship across these capabilities. I.e., when creating an instance of "Firewall Service B", which instance(s) of "Shareable_FW" *VNF* can be used? This includes "owner" aspects as well as geographical.
- This Option makes "Firewall Service A" (with a dedicated VNF) and "Firewall Service B" (with a shareable VNF) look exactly the same to the outside world, both exposing a number of concurrent uses of "1"

Note that the "Requirement" of an ANF must be fulfilled by the NF whose "NF Package" resulted in creation of that ANF Resource at onboarding time.

Problem Statement 4: Modeling a Service Containing a Shared VNF: Option C: A&AI View



Customer
(e.g. Mobility)

Firewall Factory
Service Subscription
Mobility

Firewall Factory
Service
Service Instance

Uses

Shareable_FW
VNF Instance
(VNF: Platform Resource)

Provided By

vServer

Customer
(e.g. Bob)

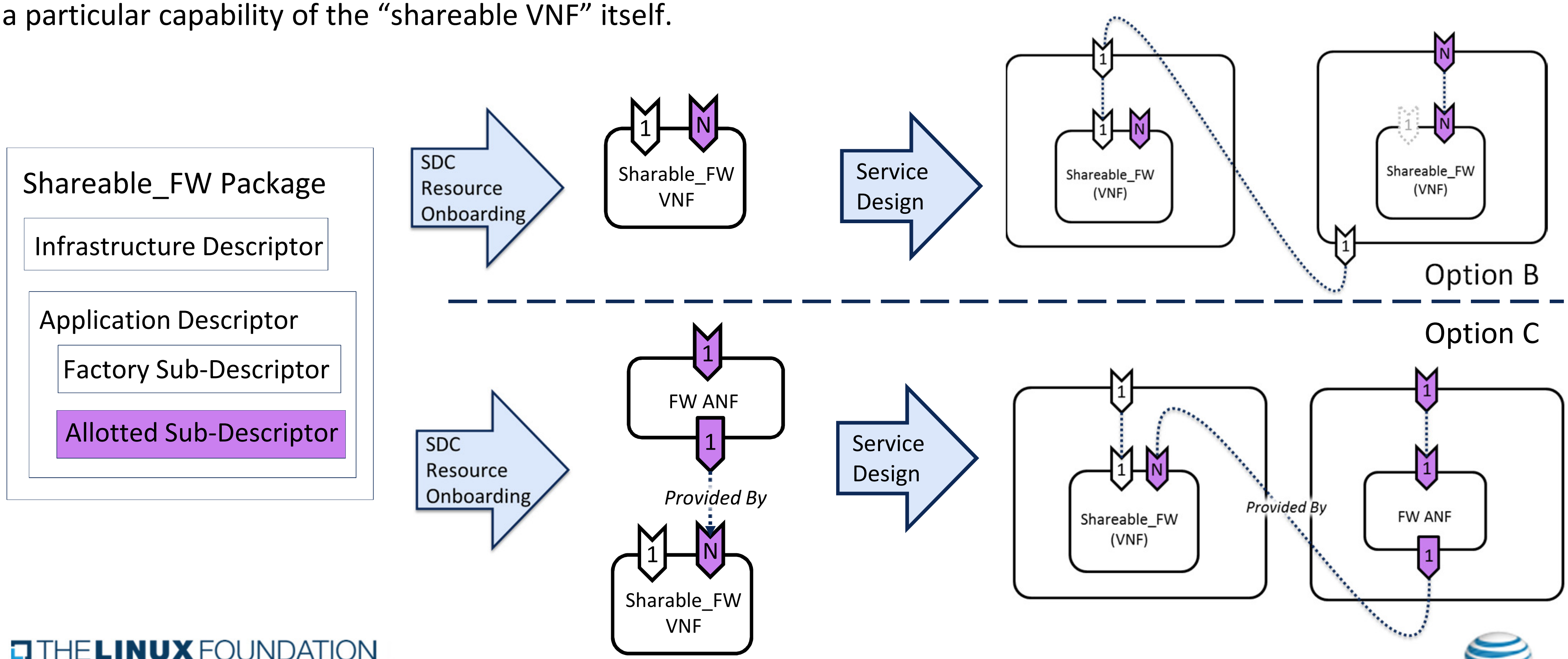
Firewall Service B
Subscription
Bob

FW ANF
ANF Instance

Firewall Service B
Service Instance

Summary of Problem Statement 4: Options B and C

In some ways, Option B can be seen as a particular implementation of “ANF”, whereby the “ANF” is represented as a particular capability of the “shareable VNF” itself.



Shareable_FW Package

Infrastructure Descriptor

Application Descriptor

Factory Sub-Descriptor

Allotted Sub-Descriptor

SDC Resource Onboarding

Sharable_FW VNF

Service Design

Option B

Option C

FW ANF

Provided By

Next Steps?

1. Architecture team approval on the Problem Statement 3. I.e., onboarding of application descriptor for a VNF should be split into “sub-descriptors”, separately capturing capabilities that differ in concurrent uses.
2. Architecture team requests modeling team to look into Problem Statement 4, weighing options A, B, and C and coming up with new options as appropriate. Must weigh options relative to model-driven runtime behavior, and not just design time.