

Automated Resource Control in Virtualized Network Environments

Pedro Martinez-Julia

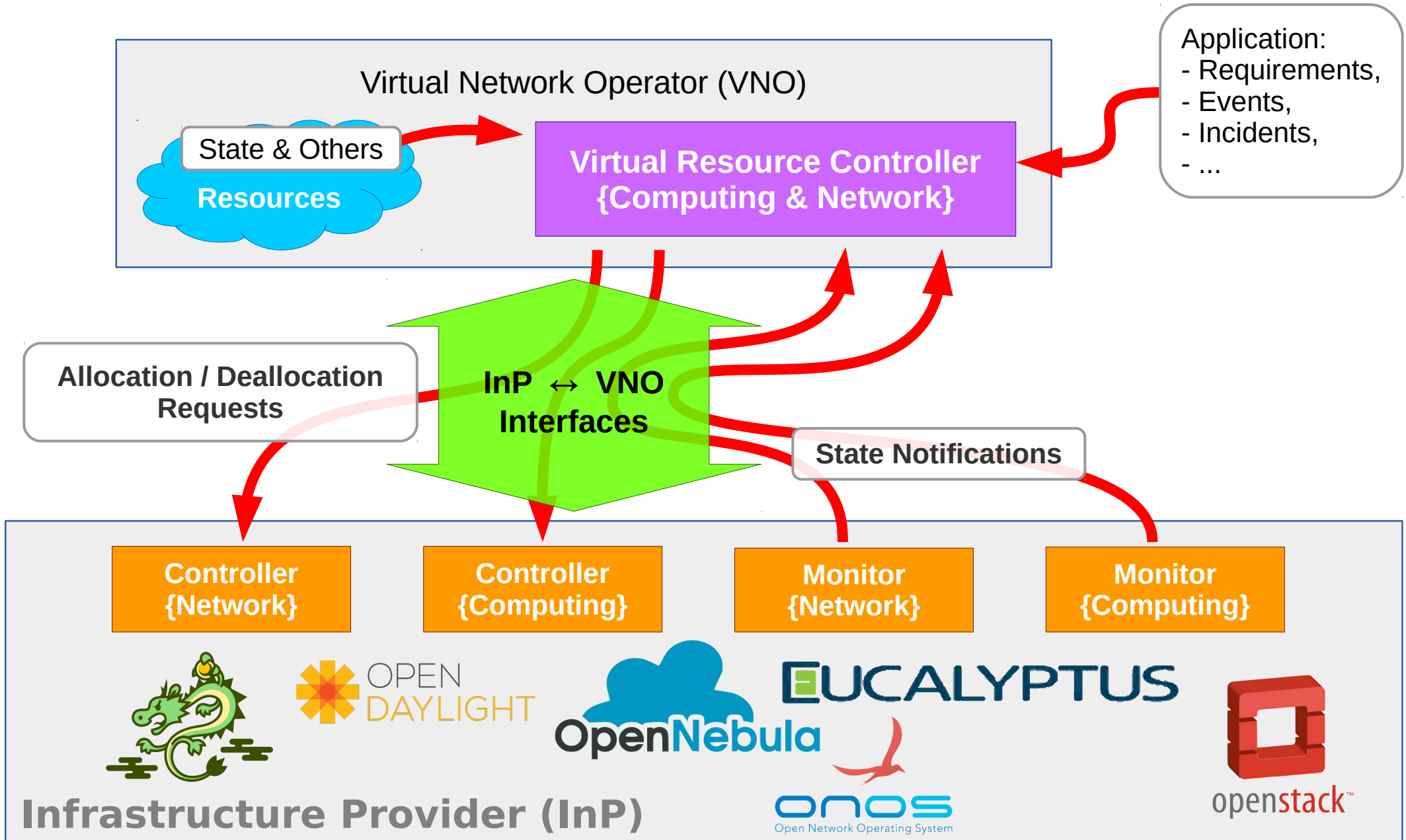
Network Science and Convergence Device Technology Laboratory, Network System Research Institute
National Institute of Information and Communications Technology (NICT)

pedro@nict.go.jp

Network Function Virtualization Research Group, Internet Research Task Force
IETF 97 Meeting, Seoul, South Korea

15 November 2016

Automated Resource [De]Allocation (I)



Application:
- Requirements,
- Events,
- Incidents,
- ...

Allocation / Deallocation Requests

State Notifications

Controller {Network}

Controller {Computing}

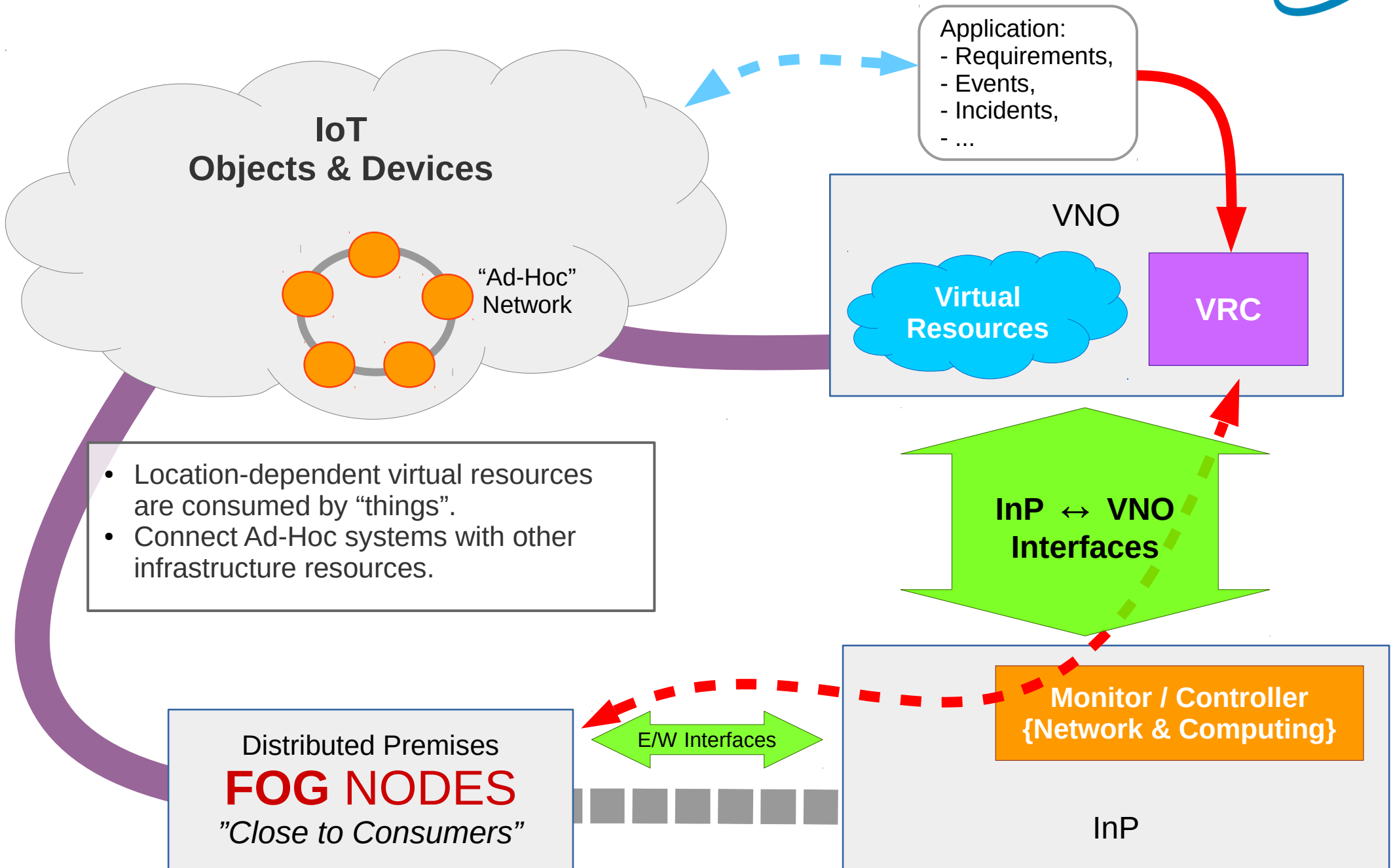
Monitor {Network}

Monitor {Computing}

Infrastructure Provider (InP)

- Justification:
 - Enable **Virtual Network Operators (VNOs)** to adapt elastically their allocated resources to tackle dynamic requirements, events, and incidents, such as in emergency situations.
 - However, it is difficult for VNOs to “talk” to different **Infrastructure Providers (InPs)** and get the same functions, as their interfaces are heterogeneous and not idempotent.
- Challenges:
 - Research and agree common methods for VNOs to interact with InPs to communicate their basic **de/allocations** or **adaptations** requests, for example:
 - OpenDayLight, ONOS, Ryu, etc. (REST):
 - POST /resources/network/links ; PUT /resources/network/links/XXXXX
 - OpenStack, OpenNebula, Eucalyptus, etc. (REST):
 - POST /resources/computing/nodes ; PUT /resources/computing/nodes/YYYYY
 - Both including a JSON (or preferably RDF/Turtle) body with the description of the resources.
 - Specify common methods for InPs to **notify** the state of allocated resources to VNOs, including resource usage statistics:
 - Polling the REST interface is not a good approach, a “PUSH” approach should be used.
 - Regardless of the encoding of requests and responses, resource **descriptions** should follow a common ontology.

Support for M2M/IoT (I)



- Justification:
 - **M2M/IoT** systems demand elastic and location-based network and computing services,
 - and need to extend “**Ad-Hoc**” systems with network and computing functions provisioned by Cloud/NFV providers.
- Challenges:
 - VNFs should be able to be instantiated within **FOG** infrastructures, which are close to their consumers.
 - Control (REST) interfaces must offer location-based (and FOG) resources:
 - POST /resources/computing/nodes
[BODY] ... Qualities: 1CPU+5RAM+500HD; Location: 5BLDG+2F; ...
[RESPONSE] ... ID: FEDCBA98 ...
 - POST /resources/network/links
[BODY] ... EpA: MY-AP; EpB: FEDCBA98; ...
 - This requires:
 - InP interfaces to expose Cloud and FOG resources with little hassle for consumers:
 - Stabilizing interfaces among InPs or among their premises (east/west).
 - Mechanisms to interconnect data-planes of “things” and Cloud/NFV providers.

**Thanks for your
attention**

Q & A

- EOF -