



OPEN NETWORKING
FOUNDATION

2015 ONF/SDN Market Opportunities Tutorial

Intent Networking

Susan Hares
shares@ndzh.com

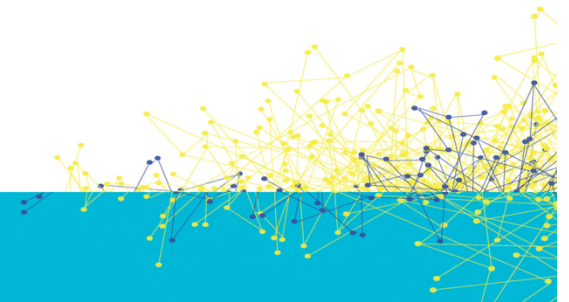


© 2015 Open Networking Foundation

Topics



- What is Intent-based networking?
- The proposed NEMO project
- Call to Action



What is Intent?

Prescription

- Bob wants two aspirin.
- Existing rule: Bob is not allowed to have aspirin
- Result: Bob gets nothing.



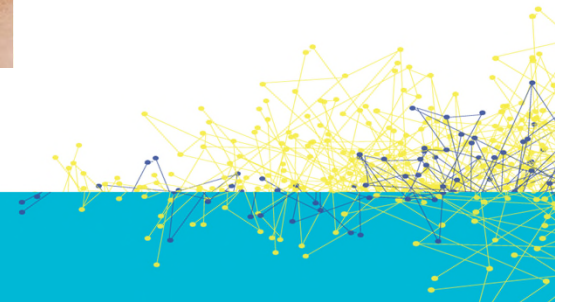
Ideas from HP's Intent slides



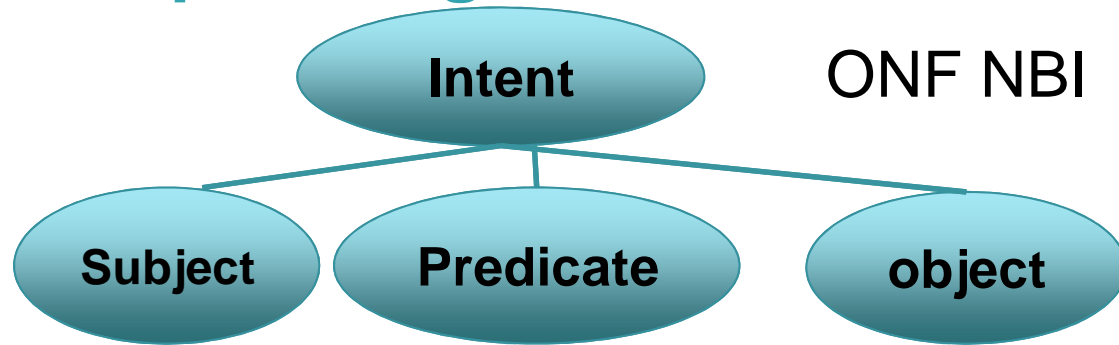
Intent (Declarative)

- Bob wants headache pain relief
- Existing rule: Bob not allowed to have aspirin

Result: Bob gets acupuncture and his headache goes away.

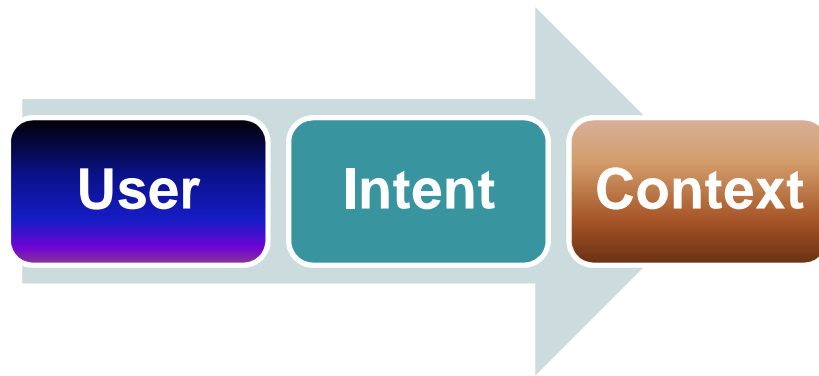


Expressing Intent

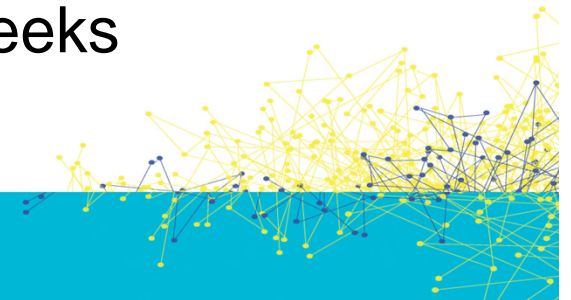


ONF NBI

Bob wants
headache relief!



Context:
Bob has had
headaches for
weeks



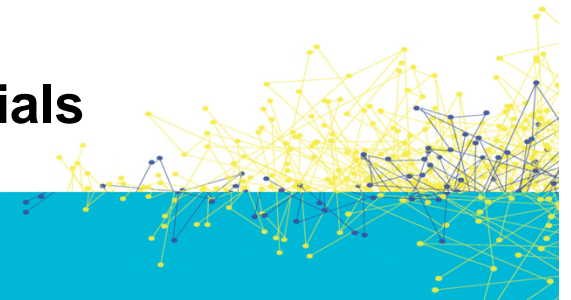
What is Intent Networking?



Manages the Network by Goals, not Prescription

- **Uses a common API** and abstraction to hide many of the network specific details
- **A portable way of integrating networked applications** with network infrastructure
- **A single Intent “rendering engine”** is the exclusive single writer of flow rules and arbiter of all resource usage.
- **Extending Controller functionality** is realized by **extending Intent “language”** and then implementing additional renderer modules to translate that intent into southbound device control

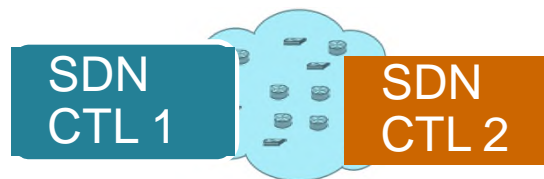
Many Proof-of-Concepts (2014-2015) and initial trials



Operator's dreams

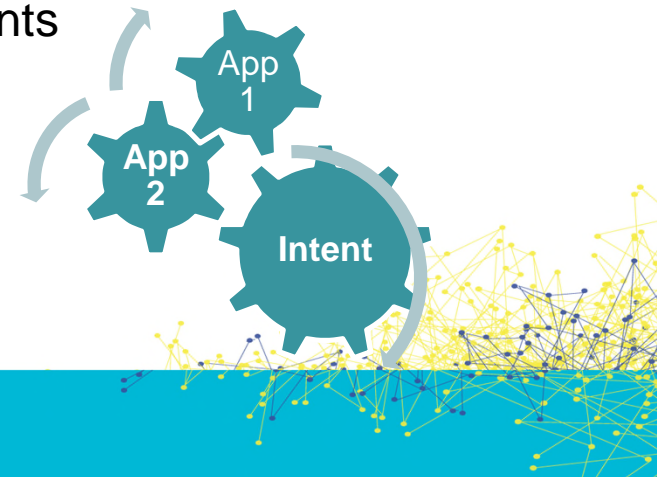
Nightmare

- Three wonderful services that SDN controllers provide collide
- SDN controllers fight over control of network, and both controllers fail because each assumes control [multi-writers problem]

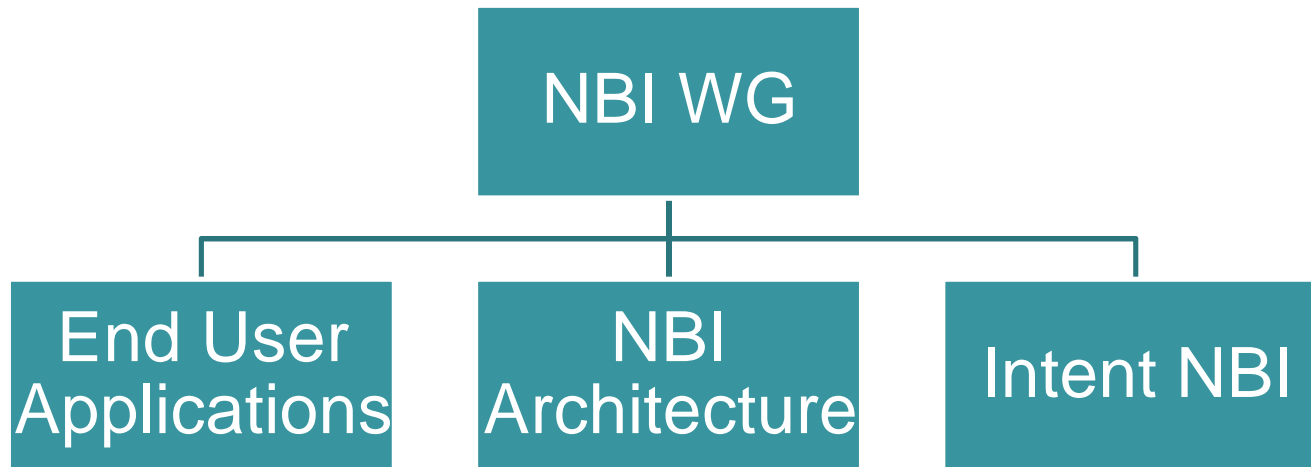


Delightful

- Users select what they want on a portal
- Intent engine runs and network automatically creates network based on users preloaded constraints



ONF Northbound Interface WG



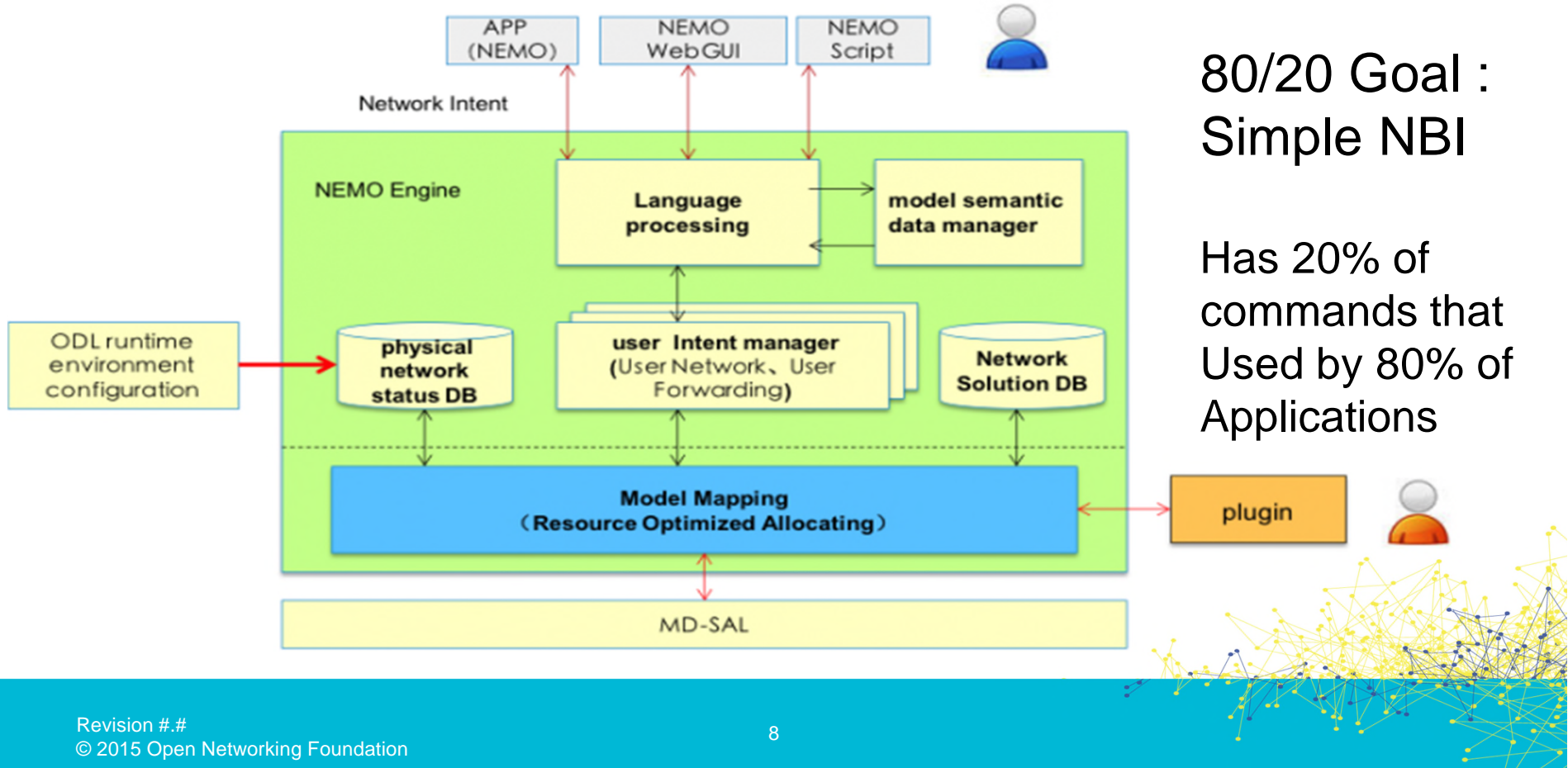
“Evolving NBI” with “clear architecture”, “domain specific”, and “intent” that help drive “Open Source efforts” necessary for “vibrant SDN ecosystem”.

NBI WG CHARTER 1.1

www.opennetworking.org/images/stories/downloads/working-groups/charter-nbi.pdf



Intent Based Nemo – ODL/OPNFV



80/20 Goal :
Simple NBI

Has 20% of
commands that
Used by 80% of
Applications

NEMO Language Syntax in Brief



Resource Access

Object Model	Node	Node entity_id Type {FN PN LN} Owner node_id Properties key1, value1
	Connection	Connection entity_id Endnodes (node1_id,node2_id) SLA key,value Properties key1 ,value1....
	Flow	Flow entity_id Match/UnMatch key1, value1 Range(value, value) Mask(value, value) Properties key1,value1

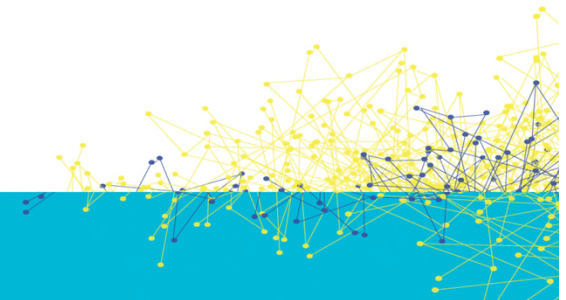
Operation Handling

Operation Model	Query	Query key Value {value} From entity_id
	Policy	Policy policy_id Appliesto entity_id Condition {expression} Action { "forwardto" "drop" "gothrough" "bypass" "guaranteeSLA" "Set" "Packetout" Node UnNode Link Unlink } Commit / Withdraw
	Notification	Notification entity_id On key Every period RegisterListener callbackfunc

Extended Model Definition

Node definition	NodeModel <node_type> Property { <data_type> : <property_name> }
Connection definition	LinkModel <Link_type>Property { <data_type> : <property_name> }
Action definition	ActionModel <Action_Name> parameter { <data_type> : <property_name> }

Composed of
3 Primitive Groups
15 Statements
36 Key Words





An Example: Bandwidth on Demand

- There is a virtual link between the branch and headquarter offices.
 - The bandwidth of the vlink can be adjusted on demand
 - The adjustment can be triggered by "conditions" meet, e.g. The bandwidth will be adjusted when the timing meets.

NEMO Script:

Node branch;

Node headquarter;

Connection tunnel **Type** P2P

Endnodes branch, headquarter;

Policy day **ApplyTo** tunnel

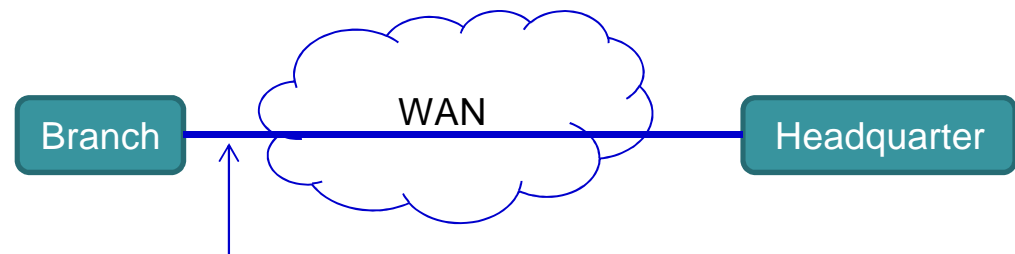
Condition time>8am & time <6pm

Operation set:bandwidth=10G;

Policy night **ApplyTo** tunnel

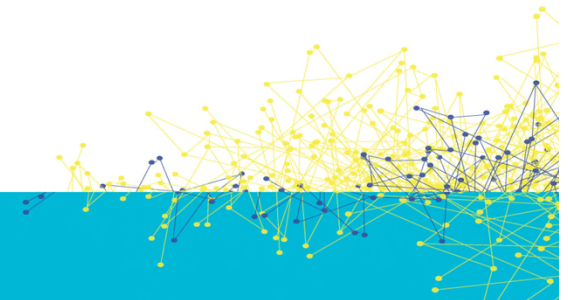
Condition (time>0am & time <8am)|| (time>6pm & time <0am)

Operation set:bandwidth=1G;

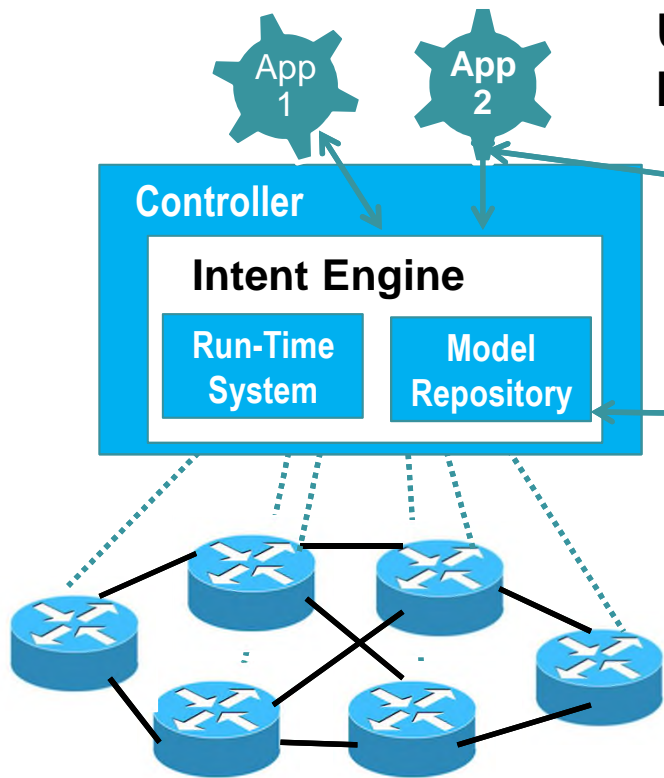


Condition: from 8am to 6pm, Bandwidth: 10G

Condition: from 6pm to 8am, Bandwidth: 1G



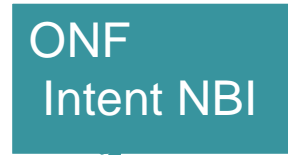
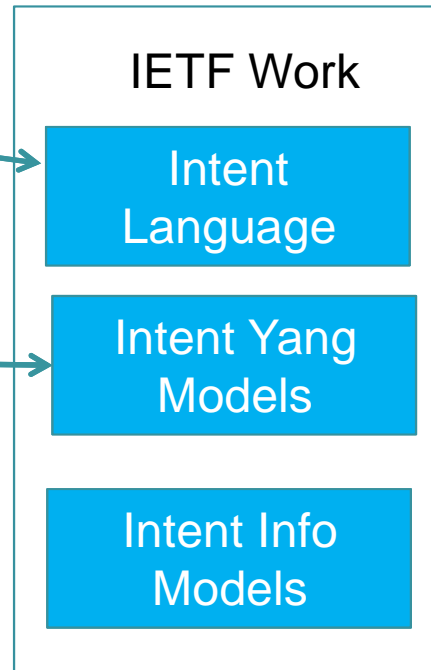
Call to Action



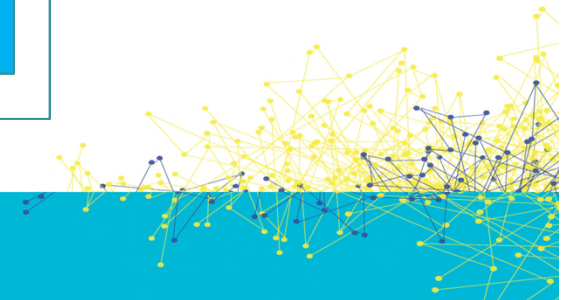
Use the Intent NBI

Write Code for Open Source

Work on Standards



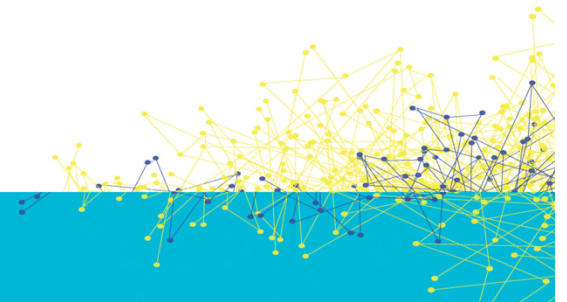
12 key requirements





Q&A

The Best part of any talk ,





OPEN NETWORKING
FOUNDATION

Thank you

www.opennetworking.org

