UNI Presentation in WoT IG, TPAC 2016 @ Lisbon

September 23. 2016

- UNI **Overware** - to connect everything*1
  - Projects the Real world onto the Cyber world utilizing objects (looks like Vertex on graph data)
  - Utilizing enhanced IPv6 addressing space
  - Extends TCP/IP mechanism with Multi-dimensional vertex service
  - Tracks all trail of visited Vertices and Current Vertex as Context*1
  - The Context of vertices is recorded over the network as a UNI Chain*3

- UNI **Underware** (antonym of Overware) - to secure the privacy
  - E2E: White List Gateway and InterVault
  - Confetti: Secret Sharing, distribution by MDVS
 - Fractal Index: Distributed data are indexed with Fractal Compression

*1: Everything: in UNI system "Everything" contains not only devices and services but also human, events and concepts.

*2: Context: Record all transition and strolling oVo history in "white board" as context user behave and stroll among Arbitrary vertices.

*3: UNI Chain: similar to block chain

Map the Real World to the Cyber World

Cyber World
UNI Address(2^{256}) Address

Real World
IPv4(2^{32}), IPv6(2^{128}) Address

Map the Real World to the Cyber World
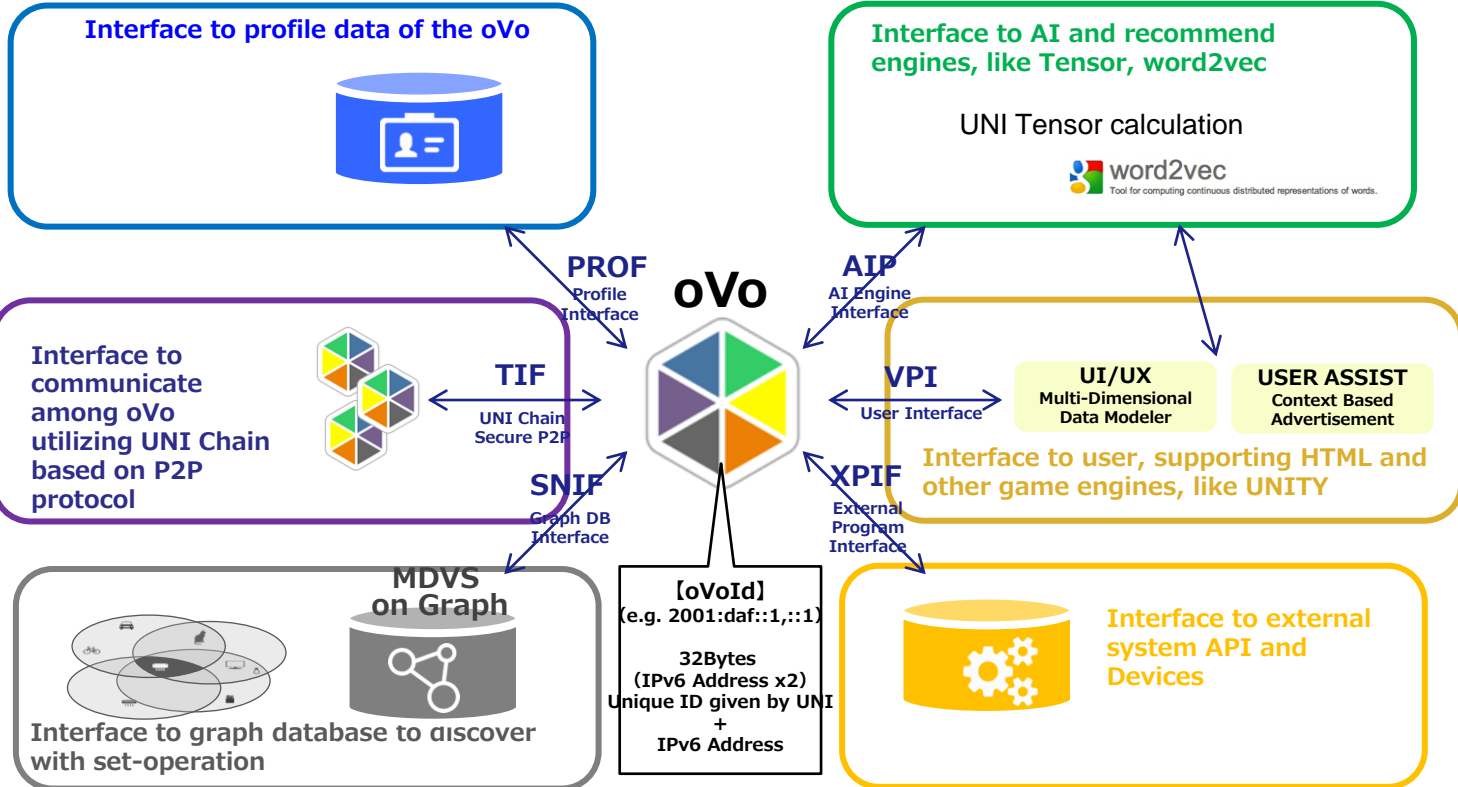

Cyber World
UNI Address(2^{256}) Address

Real World
IPv4(2^{32}), IPv6(2^{128}) Address
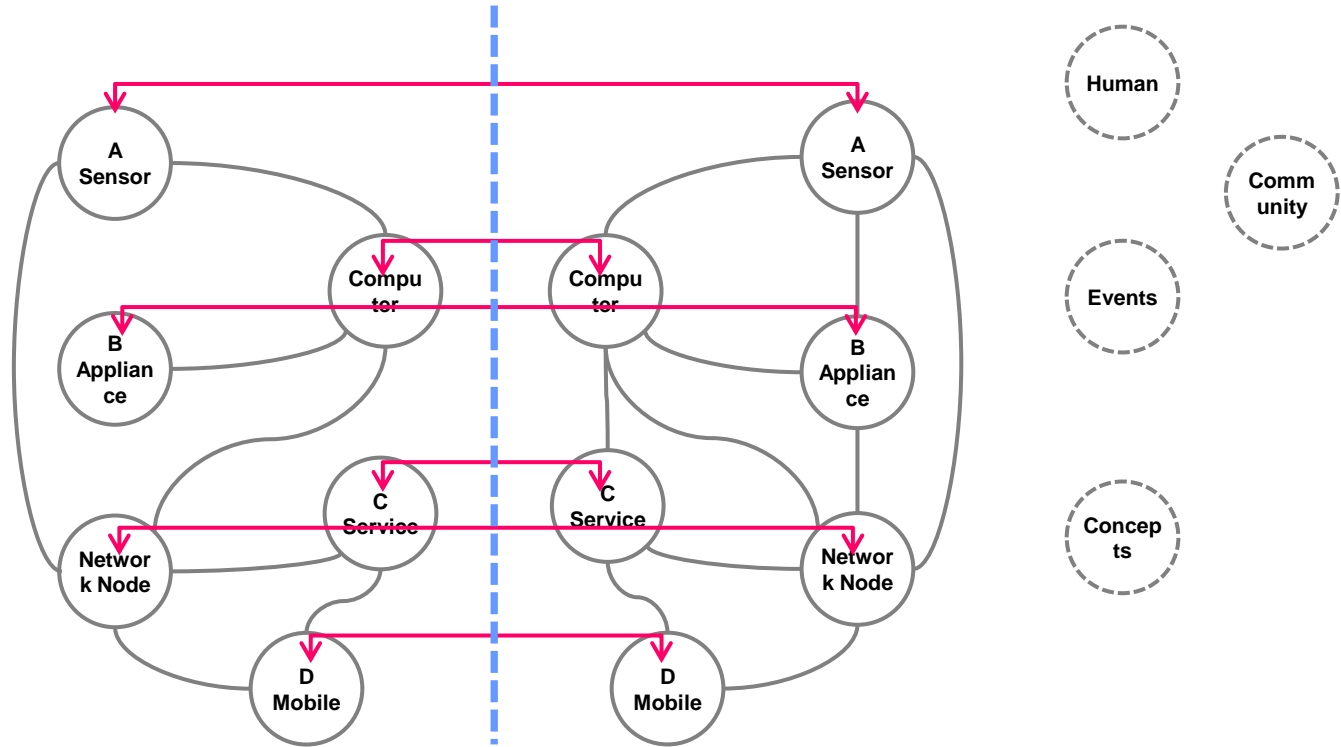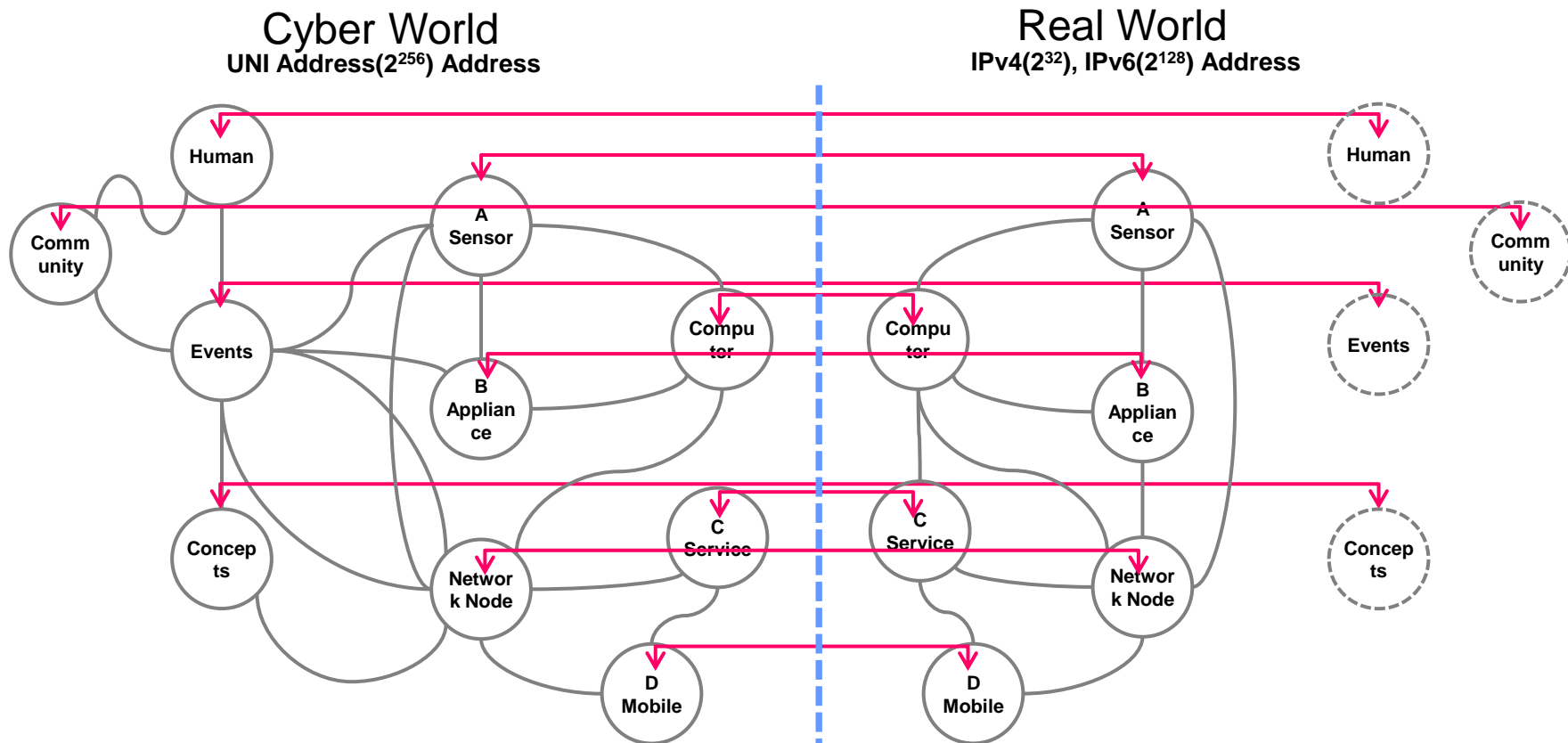
Extends TCP/IP mechanism with Multi-Dimensional Vertex Service (SNIF: Social Network InterFace)
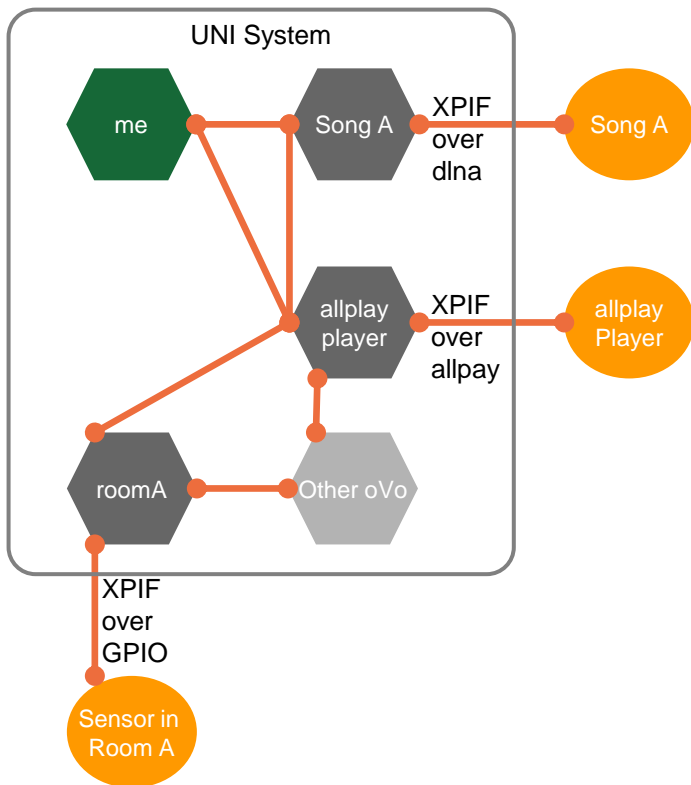
3

Key Technology of UNI - Overware Vertex Object - oVo

oVo : An object which has 32byte ID will give to not only devices but person and abstracted events, like party, meeting. Representing everything as vertex in graph data.

Interface to profile data of the oVo

Interface to AI and recommend engines, like Tensor, word2vec

UNI Tensor calculation

word2vec
Tool for computing continuous distributed representations of words.

PROF
Profile Interface

oVo

AIP
AI Engine Interface

Interface to communicate among oVo utilizing UNI Chain based on P2P protocol

TIF
UNI Chain Secure P2P

VPI
User Interface

| **UI/UX** Multi-Dimensional Data Modeler | **USER ASSIST** Context Based Advertisement |

Interface to user, supporting HTML and other game engines, like UNITY

SNIF
Graph DB Interface

XPIF
External Program Interface

MDVS on Graph

【oVoId】
(e.g. 2001:daf::1,::1)

32Bytes
(IPv6 Address x2)
Unique ID given by UNI
+
IPv6 Address

Interface to external system API and Devices

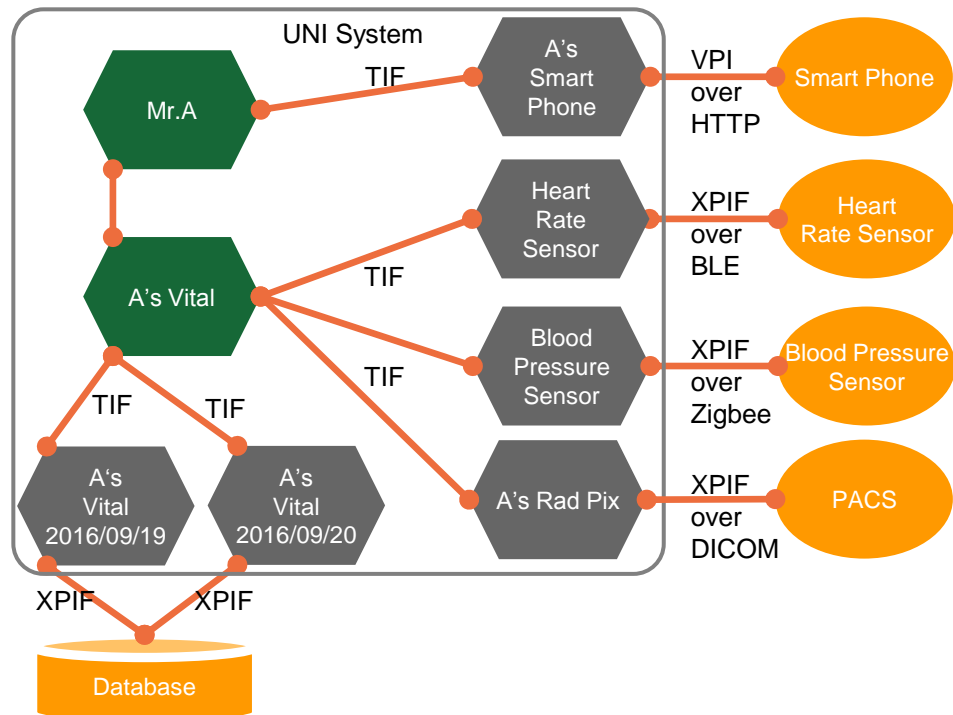**Interface to graph database to discover with set-operation**

- Overware Vertex Object
- oVo is an object which has 32byte ID and is assigned to every single device, person and abstracted concepts, events, like party or meeting.
  – 16bytes for IPv6 address + 16bytes for UNI unique ID
- oVo is representing everything as vertex in graph data.
- oVo has only data contains URI for each interface, no binary inside oVo
  – All binary split from application to manipulate devices and services are stored in integrated application server.
- oVo has a fixed memory space
  – "White Board" is in memory space to store context
  – Exchanging data in Underware

- Medical
  - Hospital, Medical University, Nursing care service
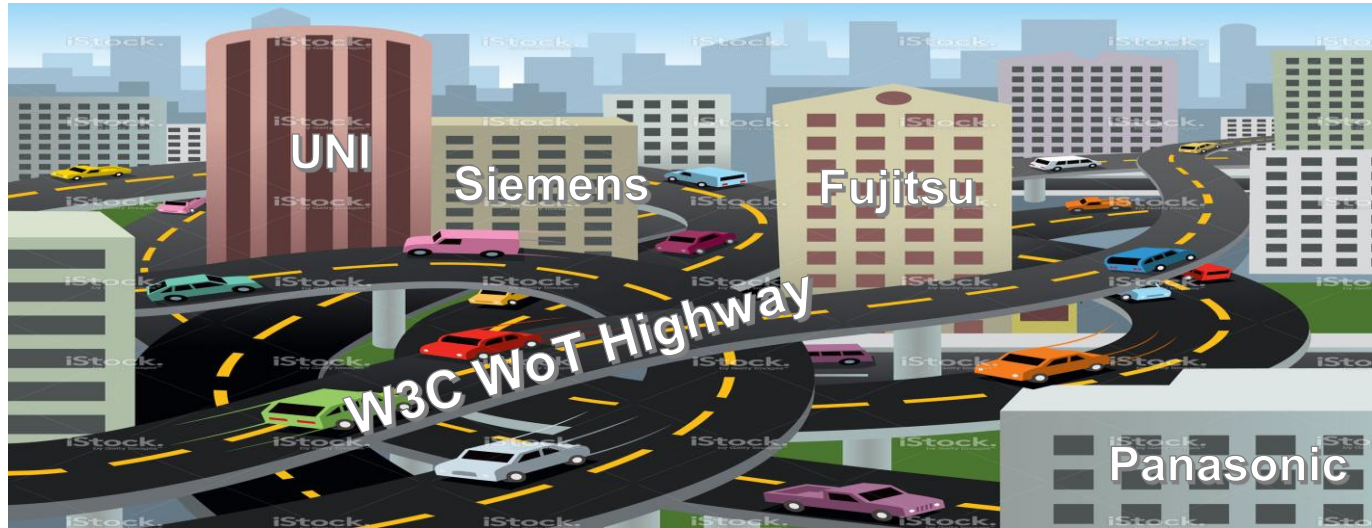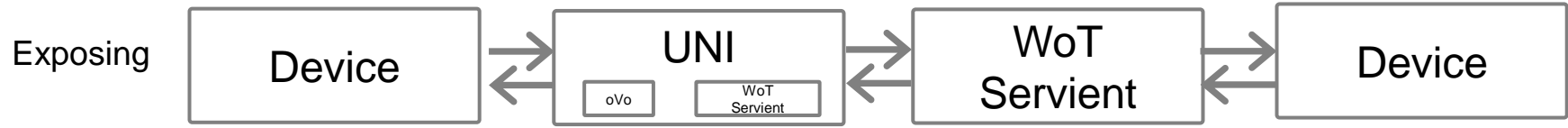
- Advertising
  - SSP, DSP, DMP

Overview of associations between UNI and outside UNI

Type of communication to WoT system

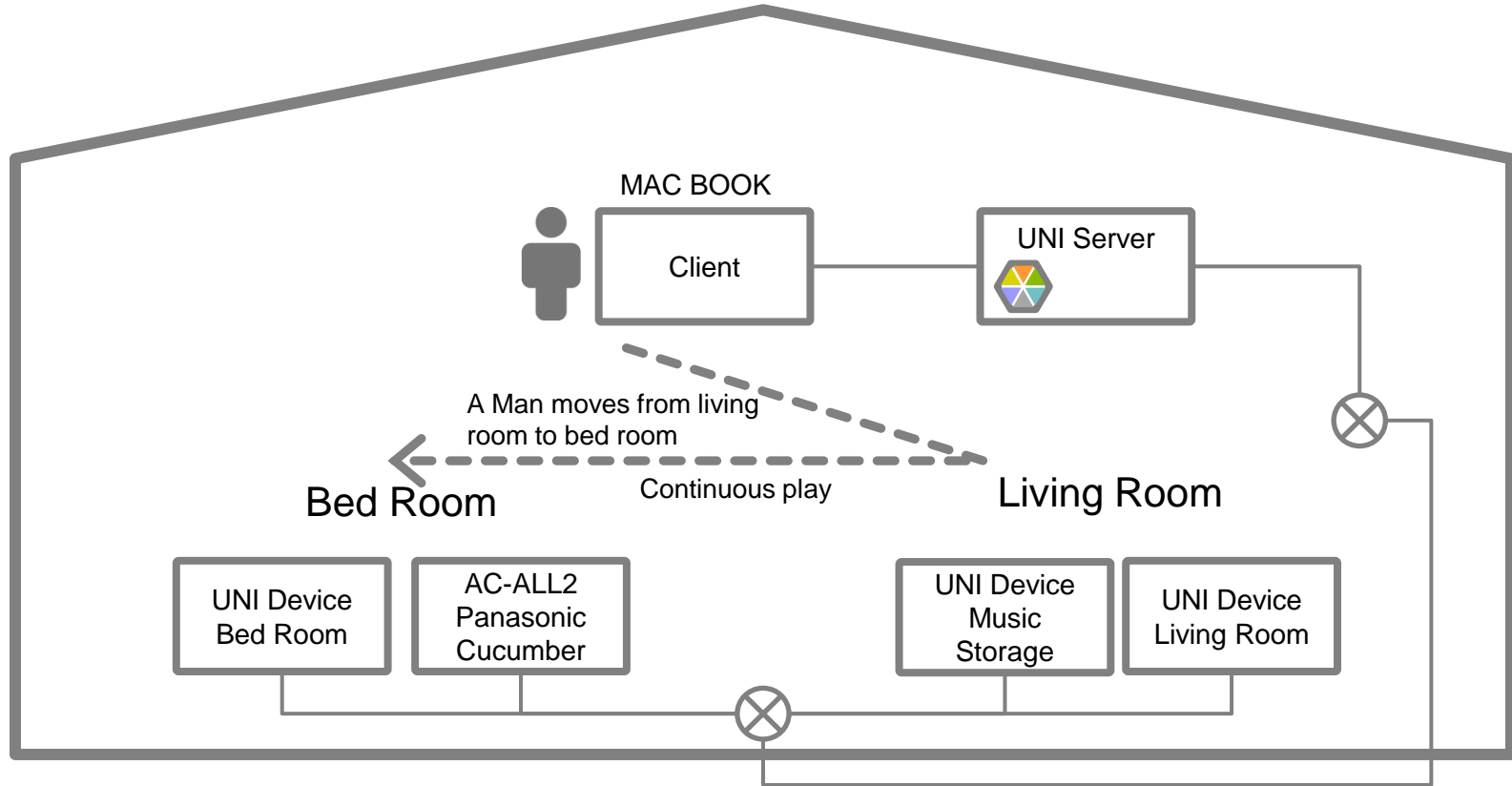# What UNI can/could contribute to WoT?

- UNI can communicate to external service over WoT interface
  - UNI has interface to external system over HTTP and will implement over WoT Interface.

- UNI could run WoT script on UNI system
  - UNI could support AP runtime
  - UNI Supports C, C++, Java, JavaScripts(node.js)
  - Script can add extra UNI functions as below
    - SNIF (Graph database interface), VPI (User Interface), AIP (AI engine interface), XPIF (binary interface), PROFILE (interface to personal data through SAML, FIDO, X.509 and other protocol)
    - SNIF is using general graph theory with triple to find oVo connecting to "me"

- UNI can manage lifecycle of script, Things Description and binaries
  - UNI oVo (vertex) has mechanism to keep itself up to date

DEMO

MAC BOOK

Client

UNI Server

A Man moves from living room to bed room

Continuous play

Bed Room

Living Room

| UNI Device Bed Room | AC-ALL2 Panasonic Cucumber | UNI Device Music Storage | UNI Device Living Room |

Demo Use Case

- Connect Devices to UNI Network with UNI UPnP
  - Discover all devices and songs connecting to network through UNI boot-up process
  - Discover A new Device with UNI UPnP when connect
  - Add new vertices in database dynamically with information from UNI UPnP
  - Get A seed oVo*1 from arbitrary cloud
  - Instantiates A oVo in local host then the oVo connect to the device
  - Then the device become operable on UNI Network
  - Play A song over both allplay and dlna protocol

- Play song in multiple rooms with context
  - Play music in a living room
  - Select and change song agnostic to a protocol of music player
  - Song follows user as moving to other room (since context of A is changed by moving)

- *1: Seed oVo: Each type of seed oVo has minimum information to create oVo, and is stored in local or cloud.

- Control all devices in home from A device not connected to home network
- Discover all songs and music players over several protocol
  - You can see the activity on graph data monitor and console
  - Relation among vertices will be created automatically
- Instantiate several oVo of device dynamically when connect
  - You can see the activity on graph data monitor and console
  - Relation among vertices will be created automatically
- Play A song over both allplay and dlna protocol
  - Play on mpeg player and allplay player
- Continuous play as changing context
  - Simulates moving by swtich

- Implement WoT Interface
  - To consume data from other servers **over WoT interface**
  - To expose data from UNI system **over WoT interface**

- Build a joint scenario

- UNI Peripherals SDK - Open source, release date: Q1, 2017
  - C, C++, Java, JS(node.js)

- UNI Chain SDK - Open API, release date: TBD
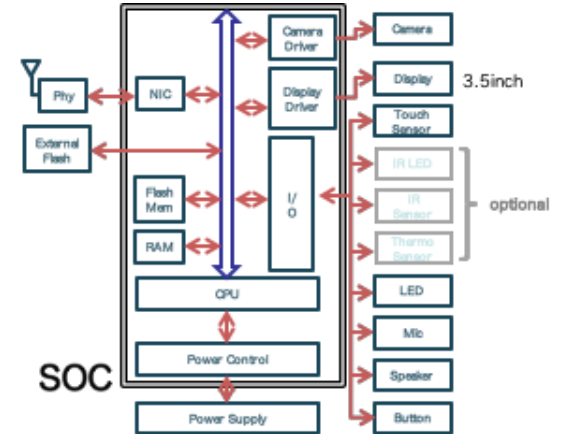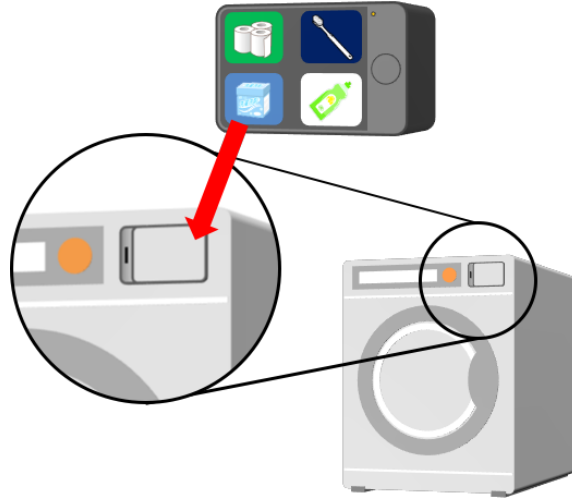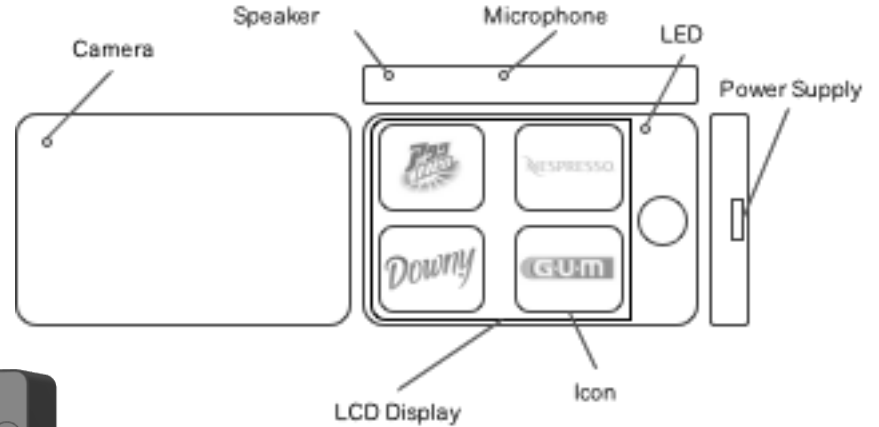 - C, C++, Java

OTHER

- UNI ZMOT
- Home Server with UNI Stack

UNI ZMOT

UNI ZMOT

A Pretty Simple Device user can order from this with one push, and could be a advertising device. Item to shop is configurable

UNI Home Server

- Functions
  - Host for internal oVo at home
  - Host of UNI Stack
  - Meson to authorize when bind multiple sub-graph
  - Super Node to manage distributed data over Peer-to-Peer protocol
  - Hosts fundamental oVos to get seed oVo from internet