

Position Paper on W3C Workshop on Multimodal Architecture and Interfaces

- **Application control based on device modality**

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Introduction

- ★ **Software engineer in IBM Japan Ltd.**

- ★ **Line of my biz is**
 - Developing pervasive computing software
 - Car navigation in conjunction with speech recognition

- ★ **My academy**
 - Project management academy association

Discussion Point - our interest -

- ★ **Input/ Output method depends on device, and may change by the environment, user preference, and other situation.**
- ★ **Multimodal system designer needs to consider application control based on the client modality.**
- ★ **We should verify that such an application can be developed based upon the current Multimodal Interface Architecture.**

Discussion Point (continue)

★ Static and Dynamic modalities of Device

– Mobile

- Cell Phone/ PDA

- Voice, Pointing device (static)
- Voice can not be used depending on each of environments (dynamic)

- In Car

- Voice, Pointing device / Touch device (static)
- Voice only while driving (dynamic)

– Desktop

- Many types of input/ output (static/ dynamic)
- User's preference (static/ dynamic)

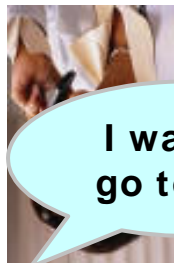
– Telephone

- Voice, DTMF (mostly static, some dynamic)

Use- case

★ Navigation application on Mobile Devices

- Cell Phone/ PDA & In Car
- Speech Reco/ TTS & Pointing Device



I want to go to xxx.



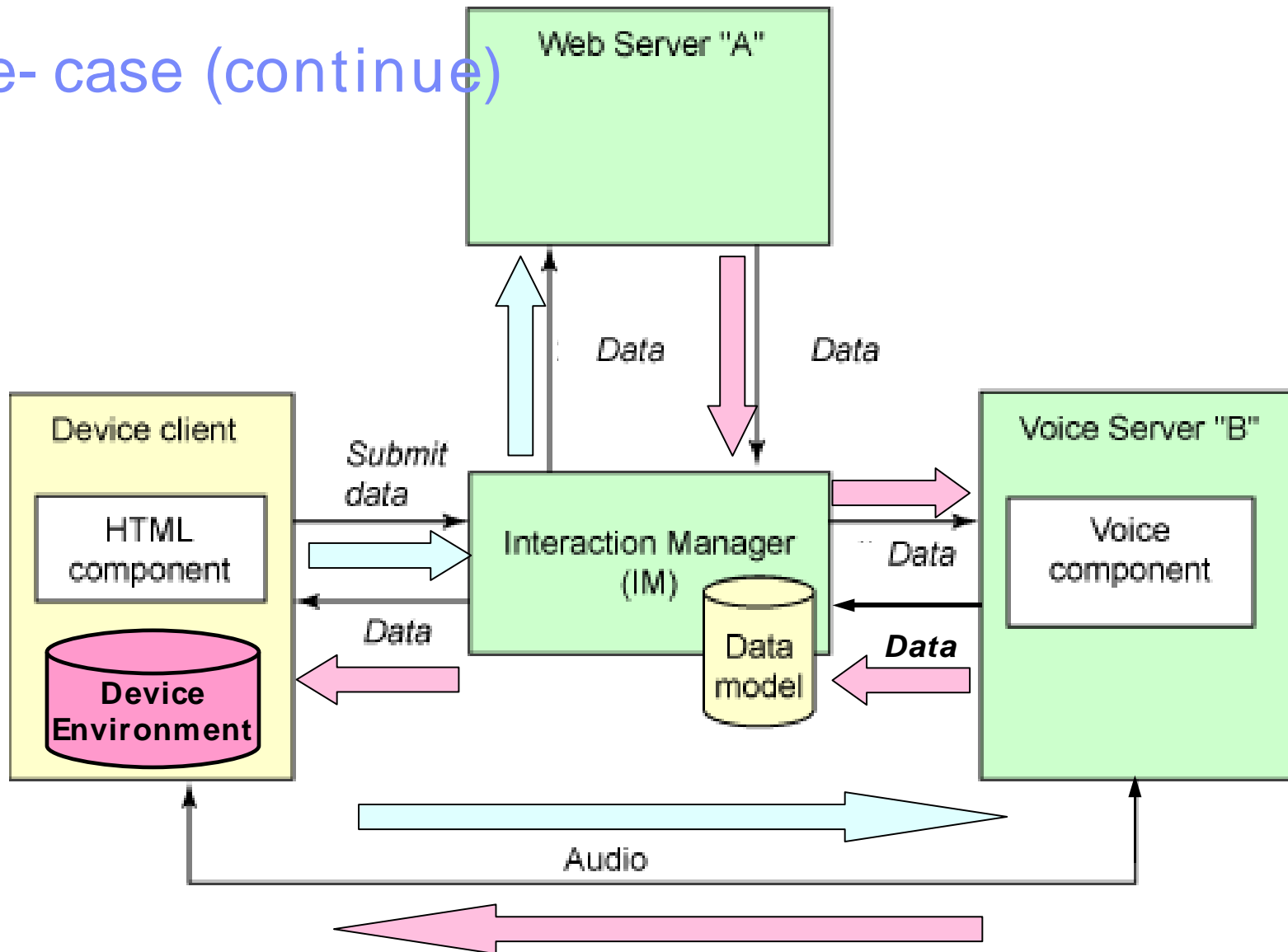
I want to go here.

Next, turn left



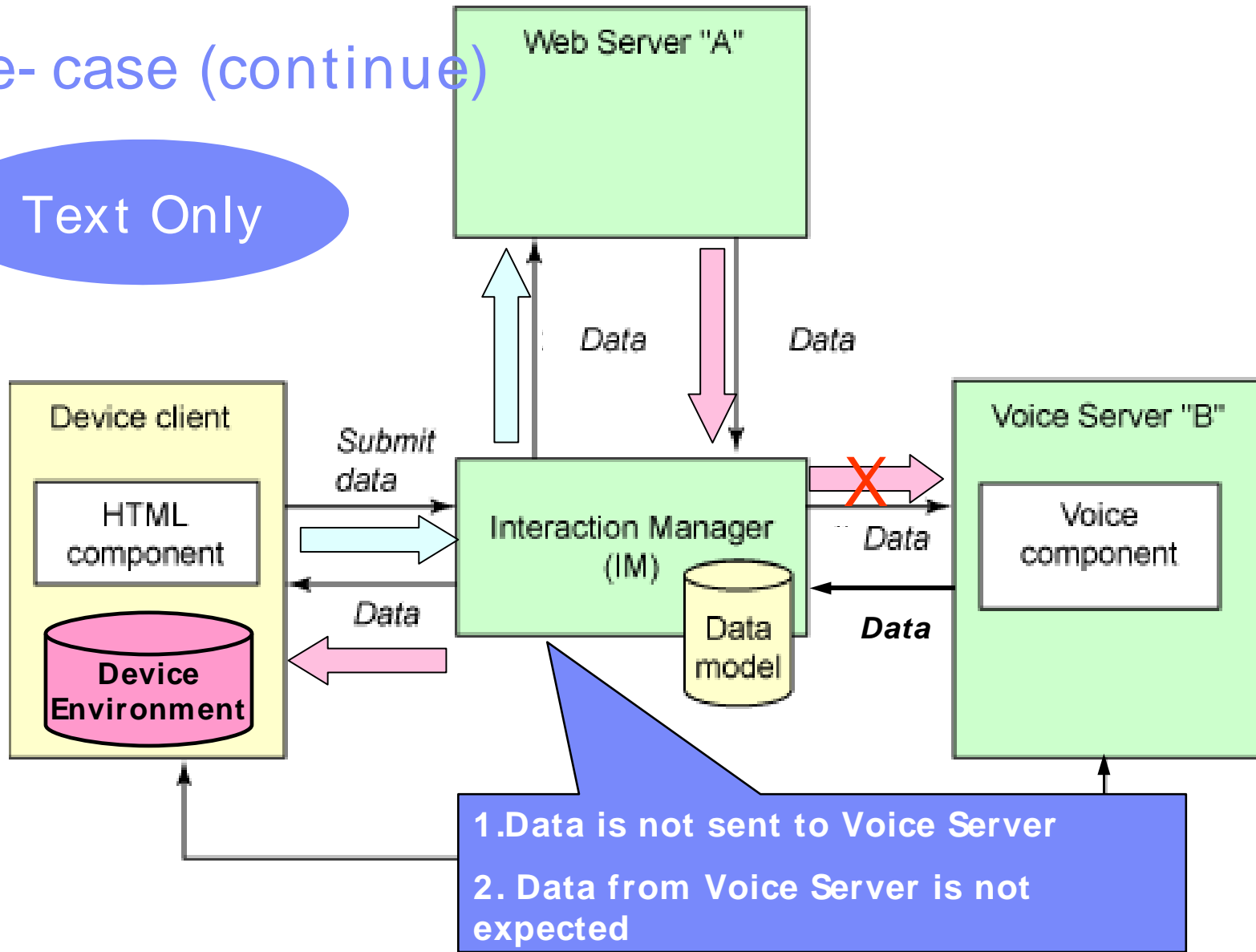
Next, turn left

Use-case (continue)



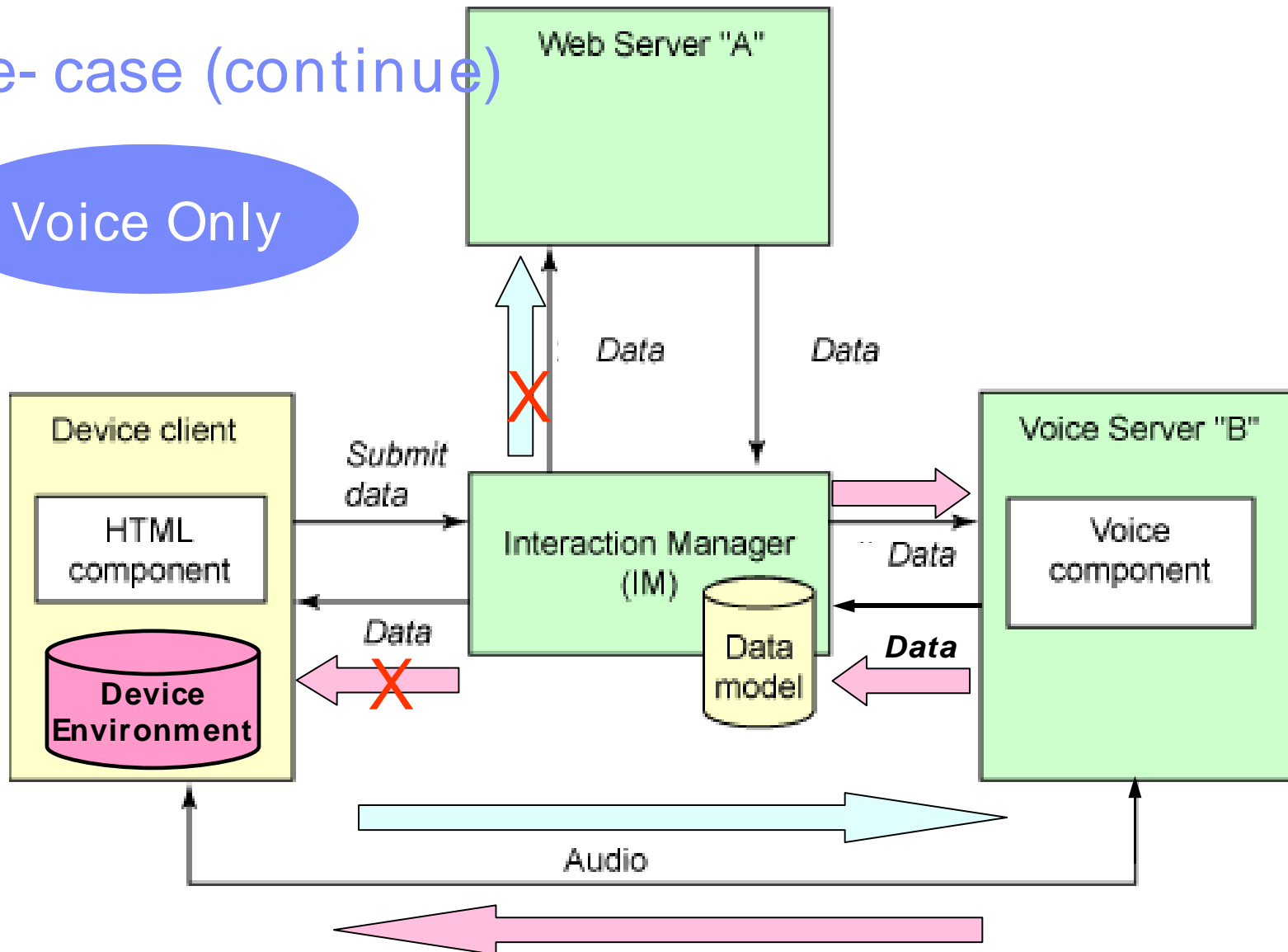
Use-case (continue)

Text Only



Use-case (continue)

Voice Only



Requirements

- 1. Static and dynamic device capabilities are to be described.**
- 2. Applications can know the current device status:**
 - 2.1 Client devices are notified modality changes by the user or events of themselves.
 - 2.2 Interaction Manager are to be notified modality changes from client devices.
- 3. Devices' properties of modalities can be queried, modified, and transferred between server and client.**
- 4. Application behavior can be changed dynamically according to the device modality status.**

Proposal (1)

1. Static and dynamic device capabilities are to be described

→ Define description of device capabilities

- Static capabilities
- Dynamic capabilities changes
(Changeable capabilities)

Perhaps they can be described as XML document

Static modality information

★ **Capability of client device**

- Speech input/ output
- Keyboard
- Pointing device
- Hand Writing
- Image recognition
- etc.

★ **Default settings**

- User preferences
- Priority
- etc.

Dynamic modality change

★ Re- Initialization of client device

- Default setting/ User preference is loaded

★ Modality change triggers

- User enabled or disabled the modality
- Application or system changed modality
 - Based on environment change (automatic/ manual)
 - Based on application scenario

★ Priority of modality

- Can be changed based on the situation

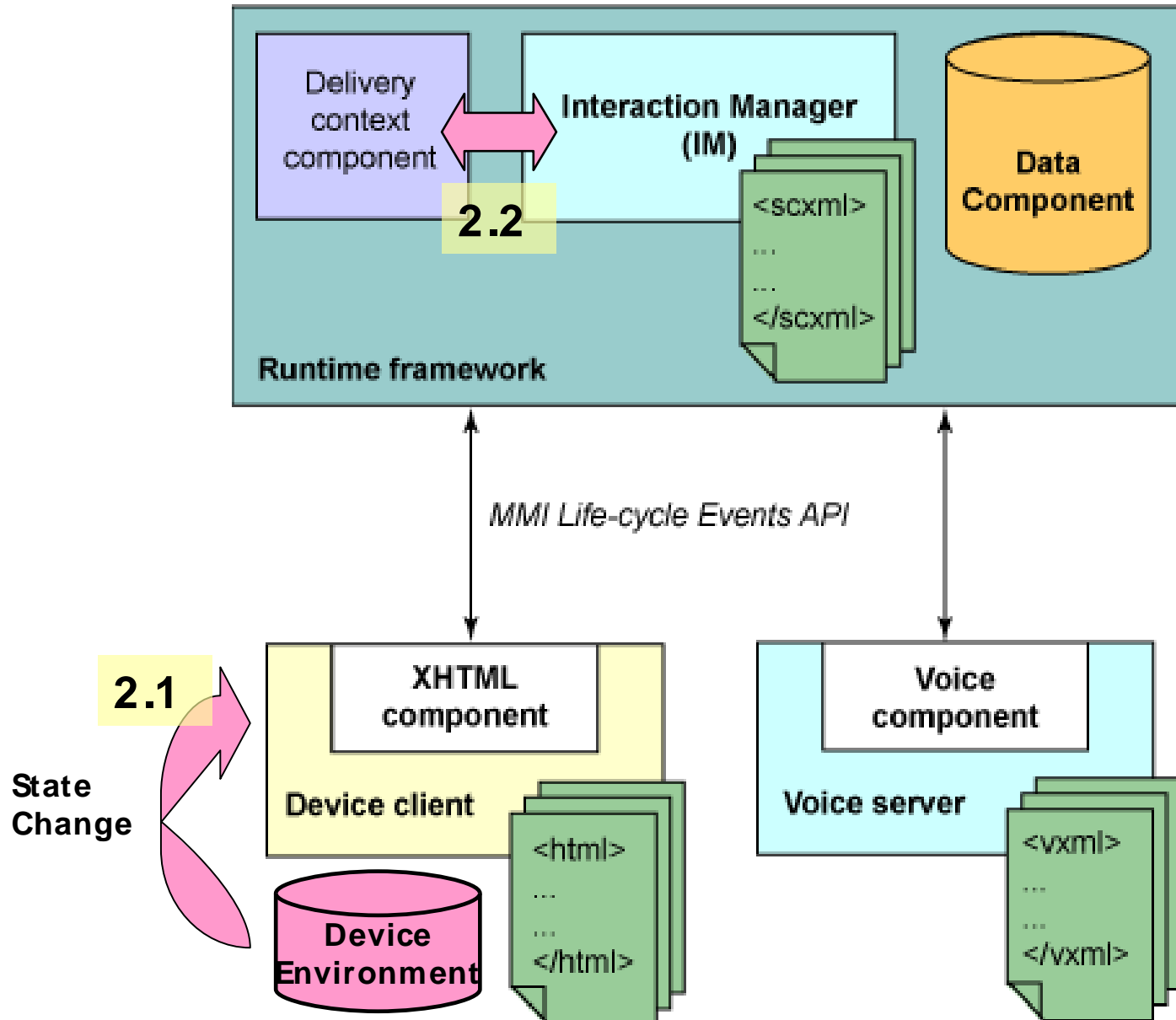
Proposal (2)

2. Applications can know the current device status:

- 2.1 Client devices are notified modality changes by the user or events of themselves.
- 2.2 Interaction Manager are to be notified modality changes of client devices.

→2.1. Define interface between the device (driver) and client Modality Component (if it's not already defined.)

→2.2. will be covered by discussion in W3C Device Independence Working Group, that defines interface between Interaction Manager and Delivery Context Component.



Proposal (3)

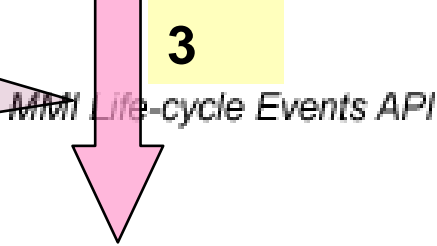
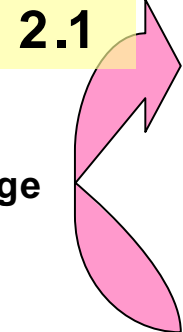
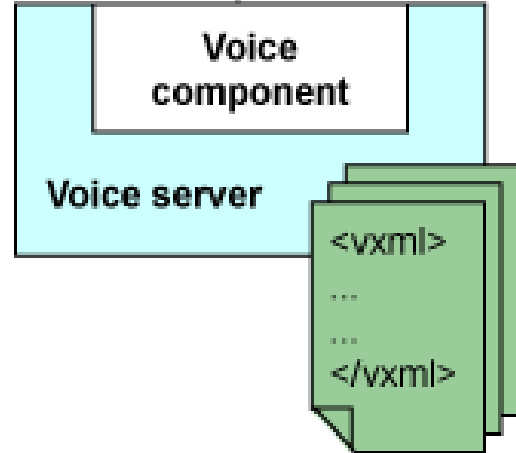
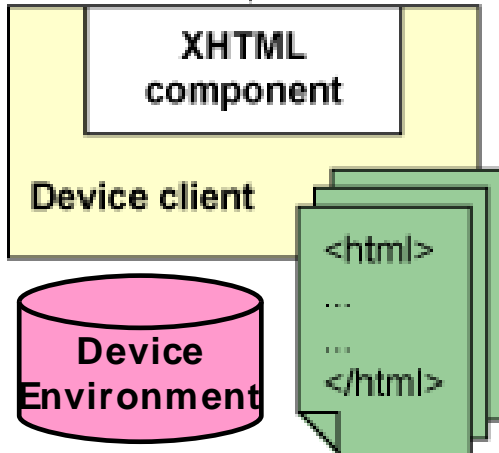
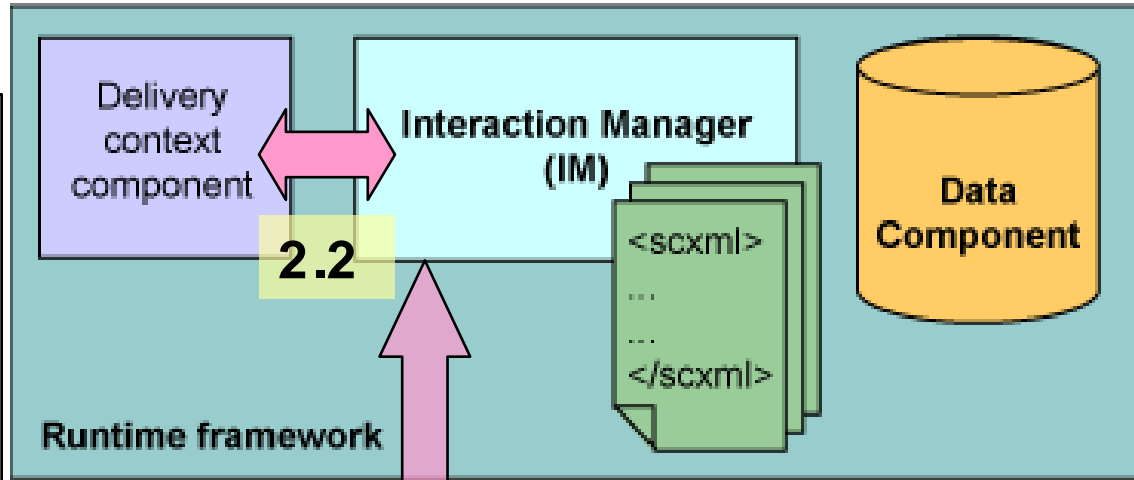
3. Devices' properties of modalities can be queried, modified, and transferred between server and client.

→Apply the MMI Life- Cycle Event API

Initial Device state is included in New Context Request Event or Prepare Event.

Device state change is included in Data Event.

Device query is done thru Status Request Event.



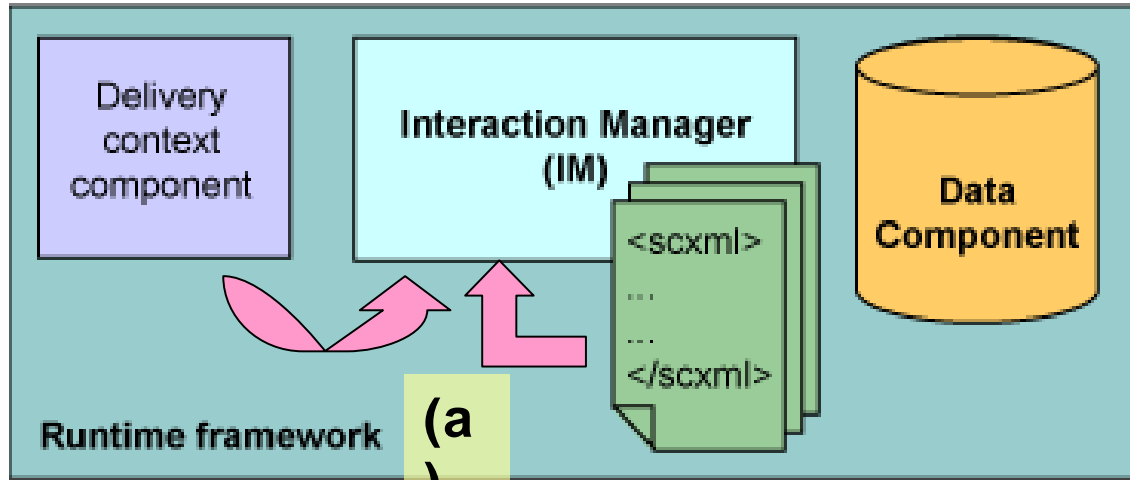
Proposal (4)

4. Application behavior can be changed dynamically according to the device modality status.

- (a) Document device state driven control in SCXML.
- (b) Select device specific SCXML.

Step1.

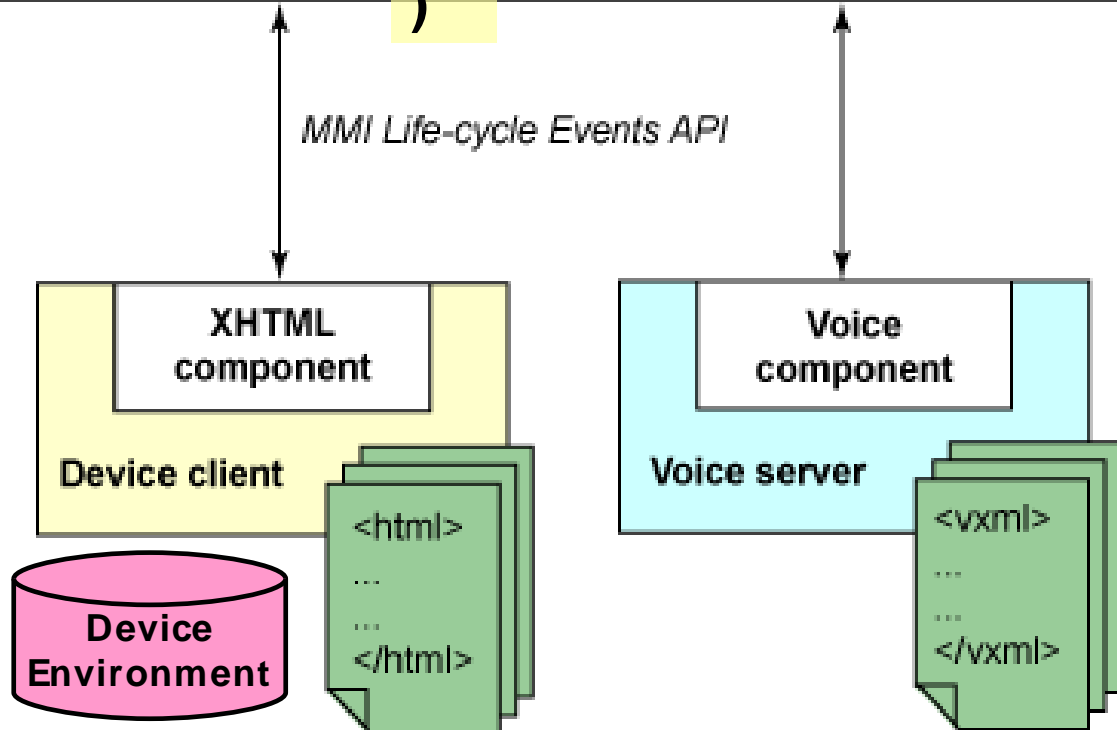
IM queries how the status of each of devices is by way of APIs of Delivery Context Component



(a)

Step2.

IM might vary its behavior depending on the result of step1.

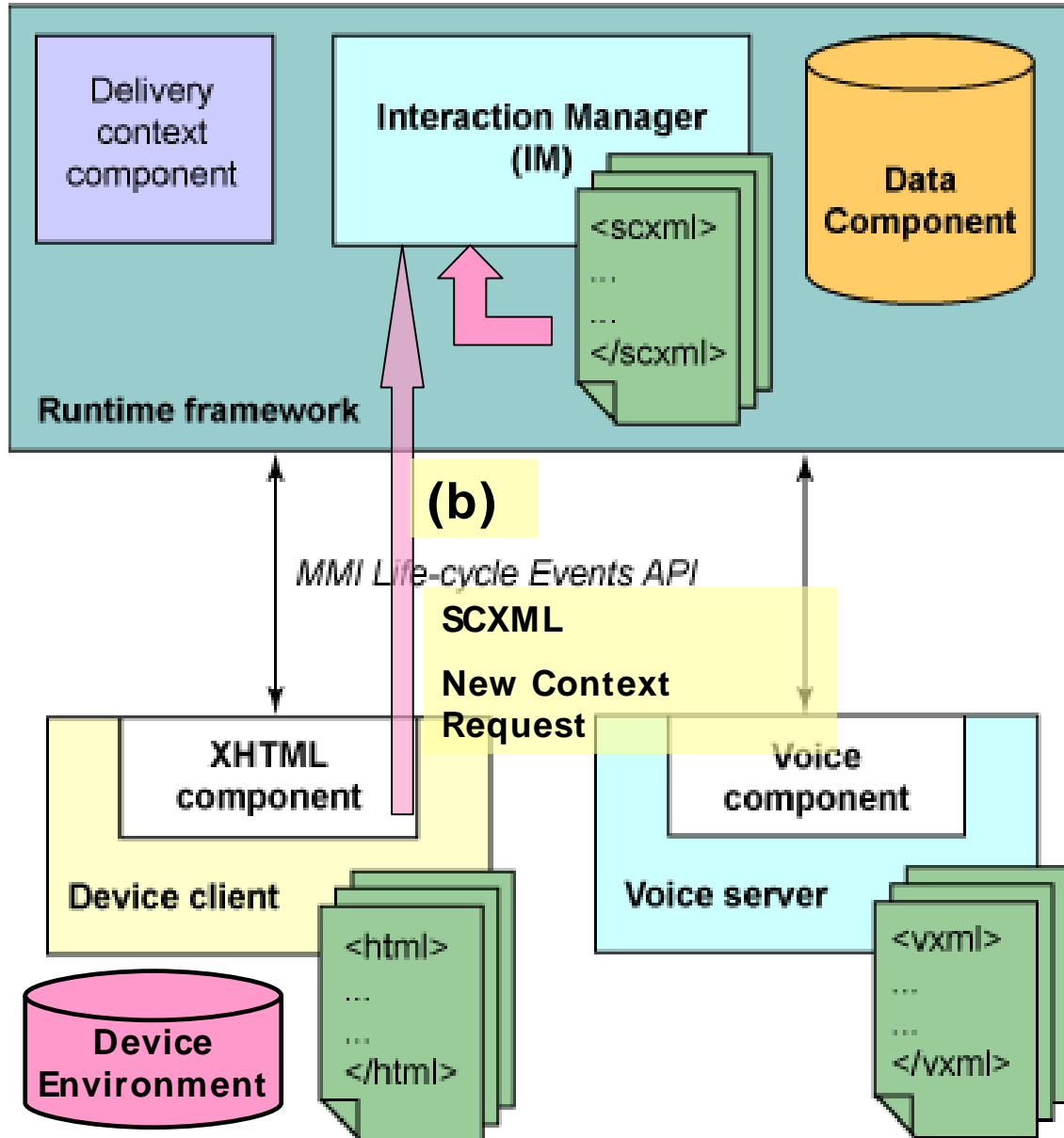


The Point

IM issues "New Context Request" depending on states of devices using the SCXML that corresponds to devices.

The catch is this;

How to choose the pertinent SCXML that fits each of devices.



Further Discussion

- ★ **Device depend application control could be developed on the current MMI architecture, but need more detail specifications especially interface for device state change.**
- ★ **Need more discussion for:**
 - If it is possible to replace or switch SCXML document dynamically based on the client state, or not
 - Timing of application behavior change
 - When modality state should reflected
 - How to apply this proposal to session type application

THANK
YOU

