

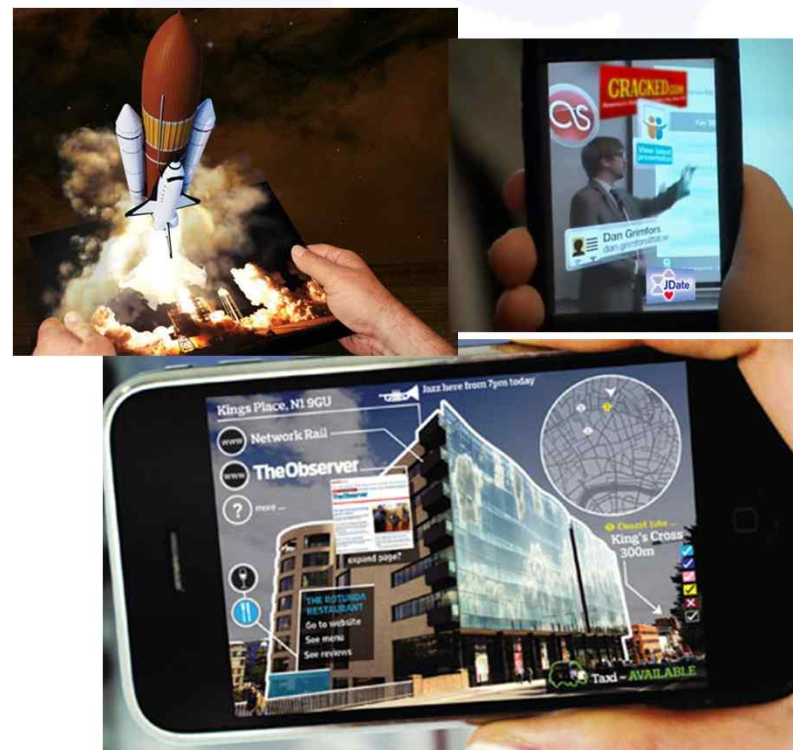
Considerations of Generic Framework For AR on the Web

Jonghong Jeon
ETRI, SRC

Email: hollobit@etri.re.kr

Blog: <http://mobile2.tistory.com>
<http://twitter.com/hollobit>

<http://www.etri.re.kr>



What is the Augmented Reality ?

Augmented reality (AR) is a term for a **live direct or indirect view of a physical real-world environment** whose elements are **merged with computer-generated virtual imagery** – creating a mixed reality.

Reality



Virtuality

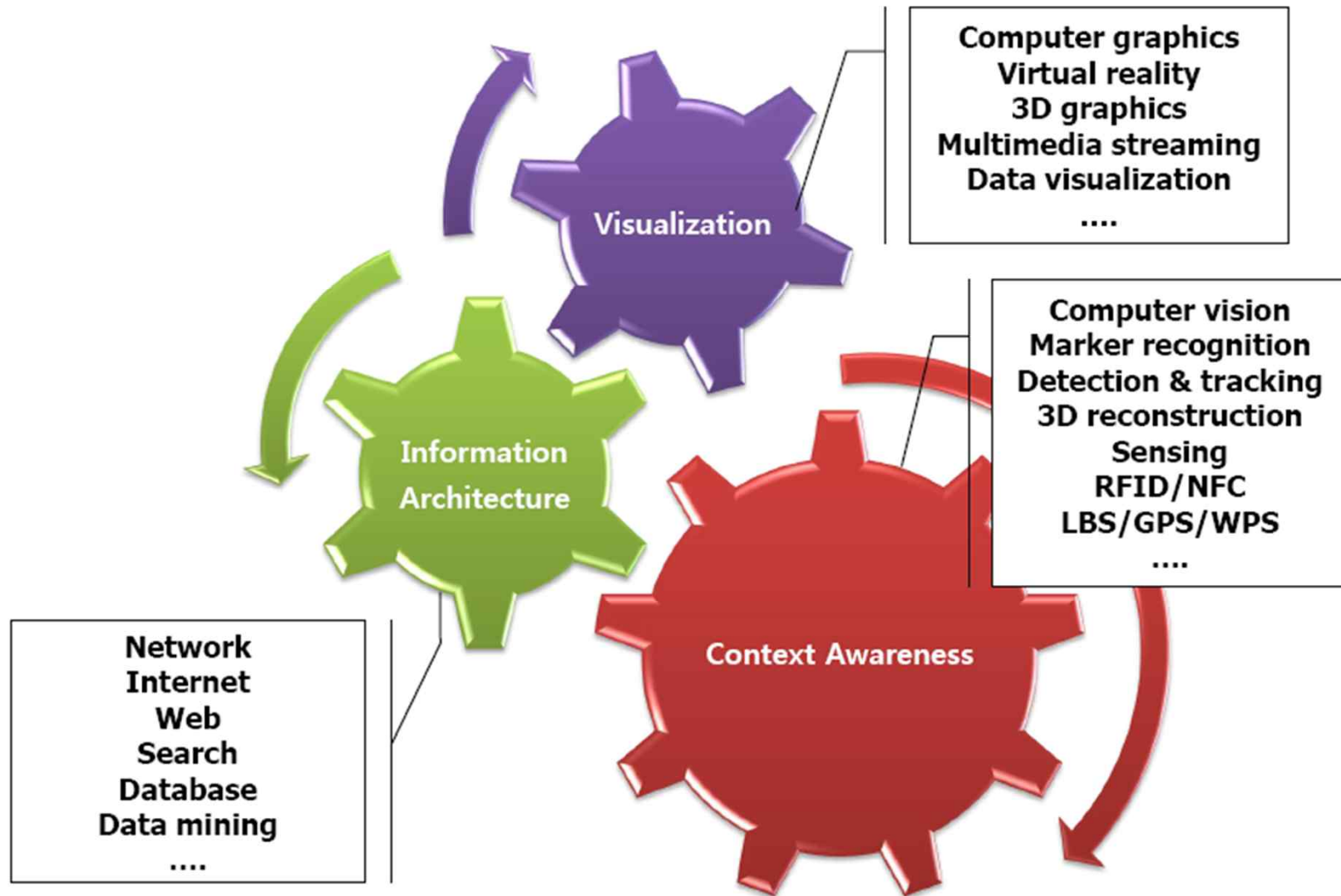


What is the Augmented Reality ?

AUGMENTED
REALITY



Augmented Reality Platform consist of ...



History of Augmented Reality



Ivan Sutherland creates the **first augmented reality system**



hollobit@etri.re.kr

'1970

'1980

'1990

'2000

'2010

At COMDEX 1992, IBM and Bellsouth introduce the **first smartphone**



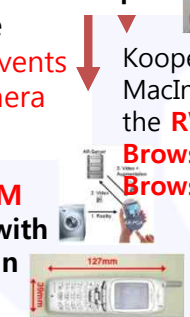
In December 1993 the **Global Positioning System (GPS)**, achieves initial operational capability



Philippe Kahn **invents the camera phone**
first GSM phone with a built-in GPS



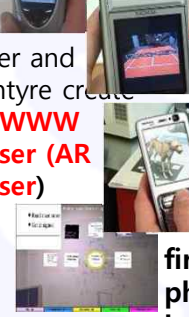
Sharp releases the **first commercial camera phone**



Kooper and MacIntyre create the **RWWW Browser (AR Browser)**



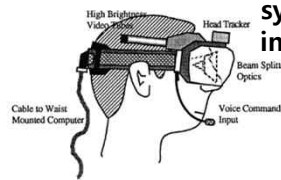
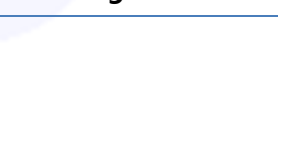
tracking 3D markers



Mobilizy launches **Wikitude**
SPRXm mobile launches **Layar**



SiteLens
first mobile phone based AR advertising



Tom Cauden and David Mizell coin the term **"augmented reality"**

Loomis et al. develop a prototype of an **outdoor navigation system for visually impaired**



Ronald Azuma presents the **first survey on Augmented Reality**



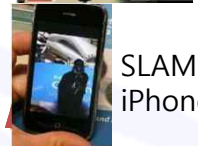
tracking system for outdoor augmented reality



METAIO presents a **commercial mobile AR museum guide**
ARhrrrrr!, the first mobile AR game



SLAM on iPhone.



Reference: <https://www.icg.tugraz.at/~daniel/HistoryOfMobileAR/>

Two Types of AR Trend



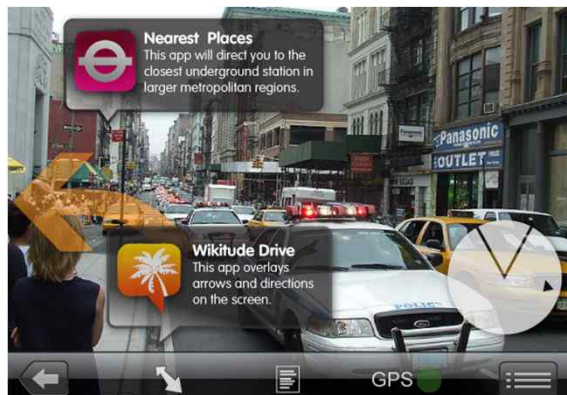
Two Types of AR Trend

Ours
target

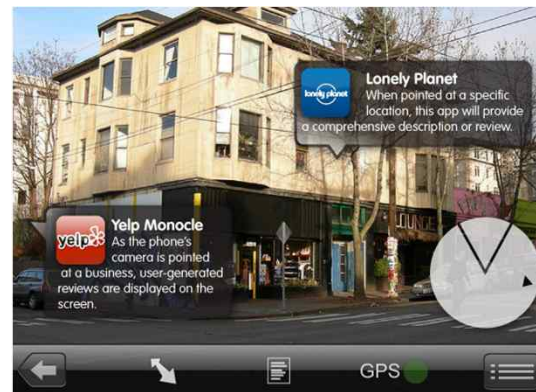
differences	Visualization Approach	Informative Approach
Main focus	Made (Virtual) Reality	Information Provide
UI	3D object overlay (rendering and registration) and interaction	Navigation (or browsing) with related information
Requirements	Graphical performance & computing power	Mash-up capability
Target Devices	Desktop (or higher)	Smartphone (or lower)
System type	Isolated system	Networked system
Augmented Target	3D object	Position, relationship, ..
Application Type	AR 3D game, AR advertising, AR based e- learning, Medical AR, AR based Technical Support System	AR information browsing, AR based Navigation, location overlays, geo- information services, gaming

Informative AR Examples and Applications

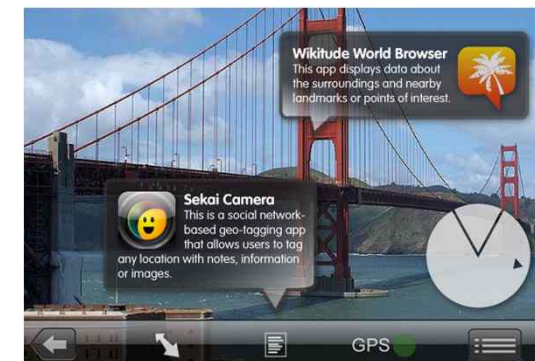
- Currently, there are four main categories of AR applications: navigation, location overlays, geo-information services, and gaming.



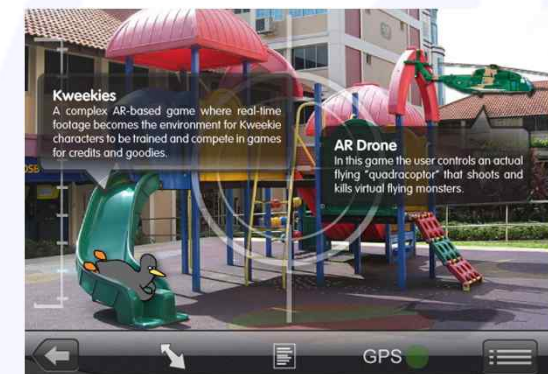
mobile AR navigation



location overlays



geo-information services



gaming

<http://gigaom.com/2010/02/02/mobile-augmented-reality-apps-that-will-change-the-way-we-see-the-world/>

AR Software Considerations

- ❑ the most important software environment for AR is the **AR browser**.
- ❑ A AR browser is a navigation application that ties geolocation data with digital contents.
 - **Pulling in and managing geodata** from both in-app sources and third party data sets
 - **Rendering 2-D and 3-D objects**
 - **Linking to web sites or phone functions** such as voice communications, text or email
 - Allowing **geotagging (or commenting) by the user**
 - Enabling data feeds from content providers to populate the mobile AR display
 - **Interfacing with the smartphone's camera** for displaying output
 - Allowing the user to filter what is displayed to them in a mobile AR session

Augmented Reality on the Web ?

Reality

(Live Video)



Augmented Information

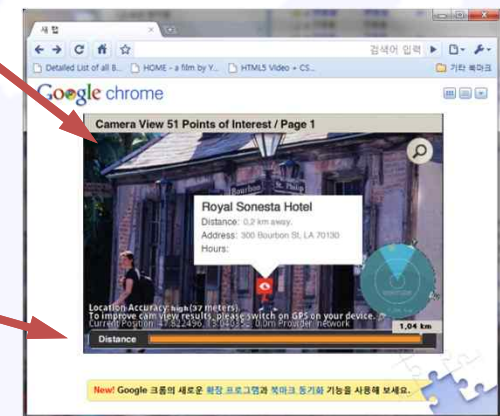


- ✓ Virtual 3D Object
- ✓ POI(Point of Interest)
- ✓ Recognized object Info.
- ✓ Social Relationship
- ✓ Related Information
- ✓ Related Links

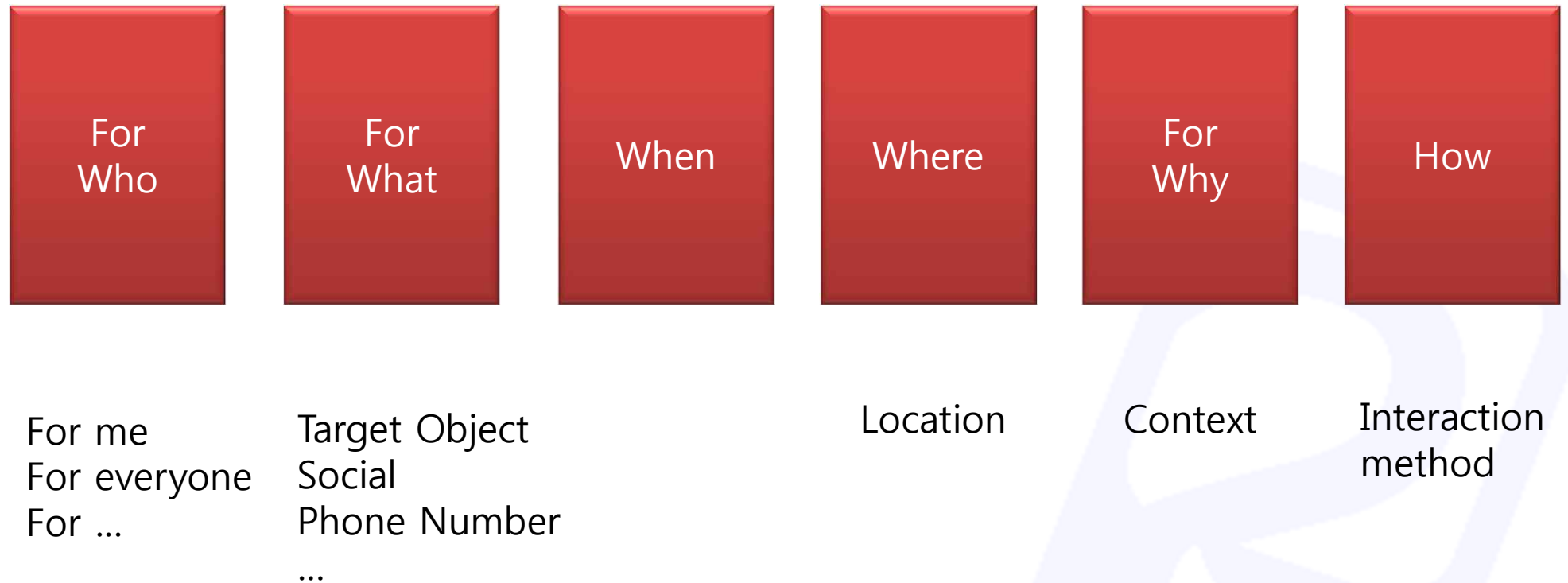
Web

AR

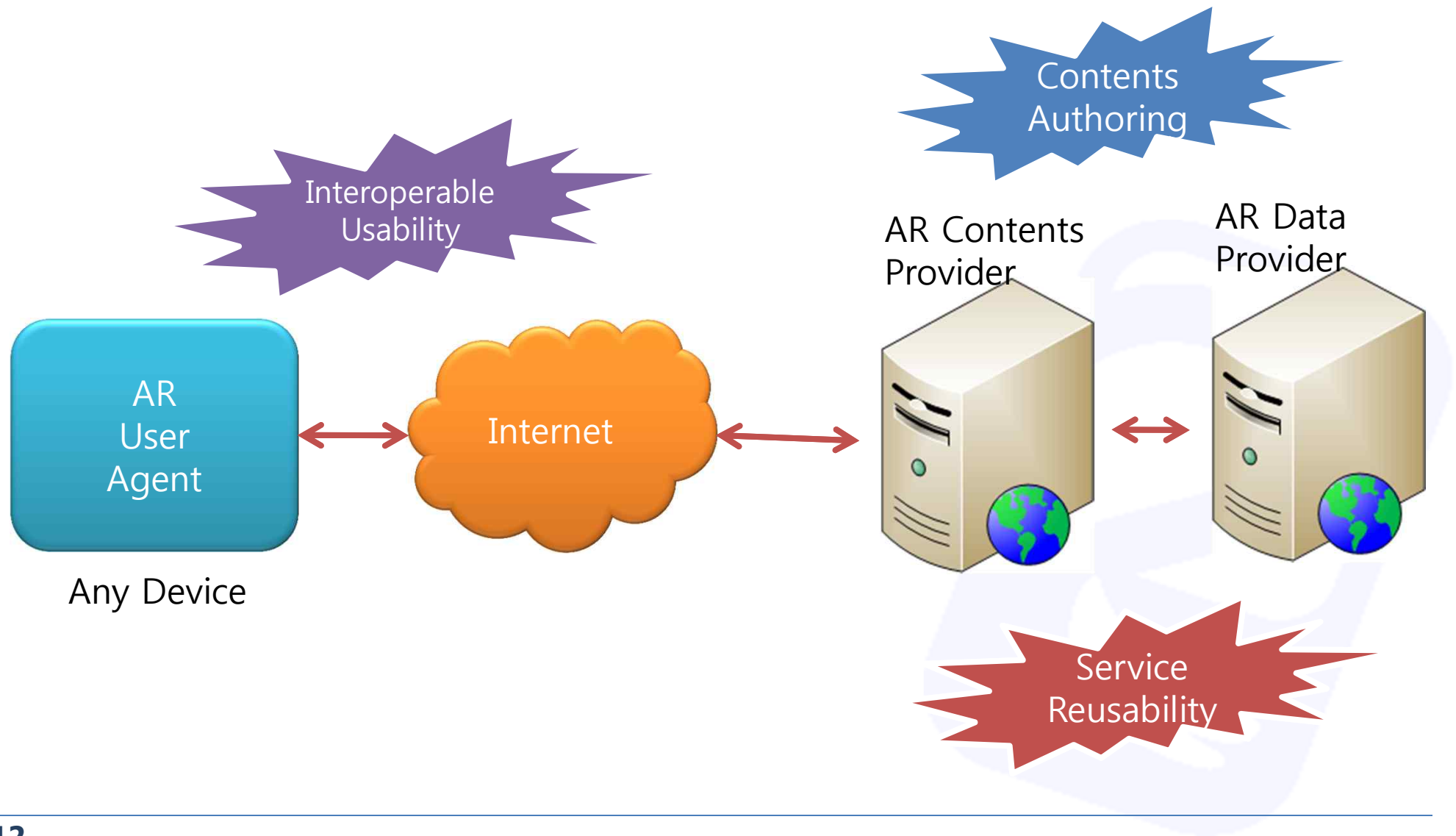
By the Web
For the Web
Of the Web



Augmented Information (or Link)



AR Contents Service Framework



Why Augmented Reality on the Web

❑ Why do we have to use another browser ?

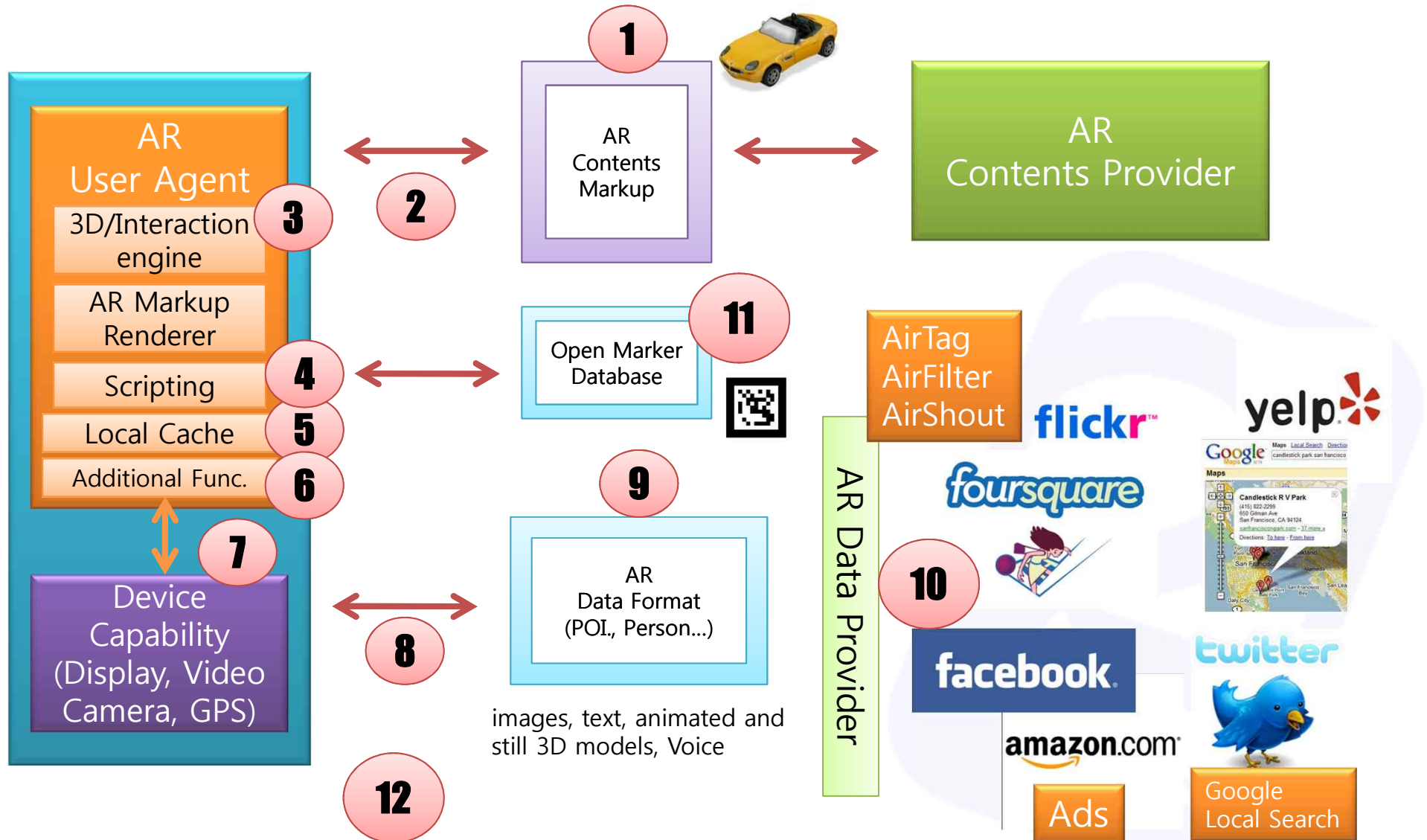
❑ Pros

- Do not need another application (AR browser)
 - Web User Agent can AR browsing
- Content Usability
 - Standards based AR Content Authoring/Providing/Consuming
- Effective AR Browsing
 - Reality (Live Video) + Augmented Link (Social, POI ...)
 - Nested AR contents browsing

❑ Cons

- Performance issue
- Browser extension

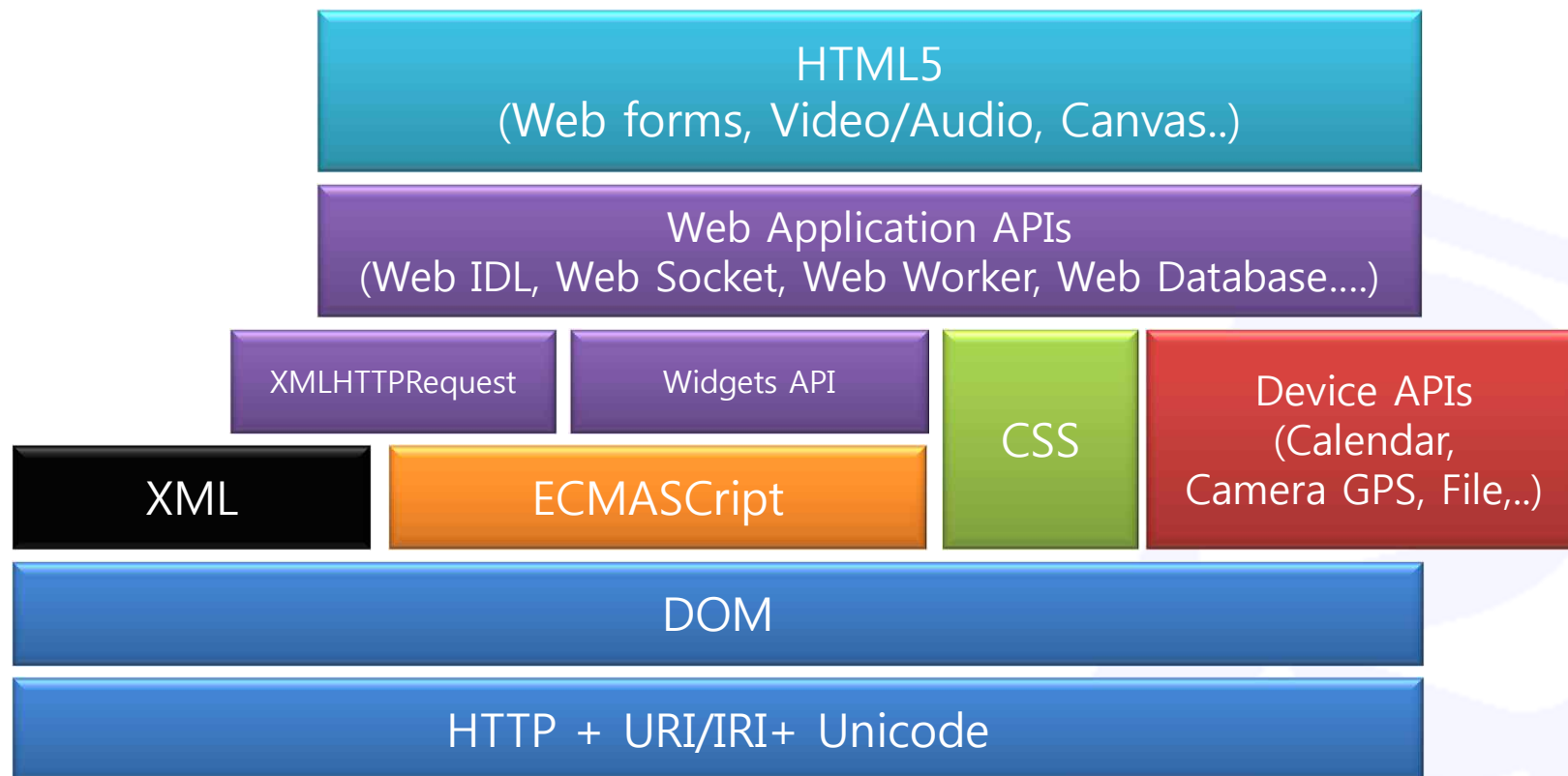
AR Interoperability Issues



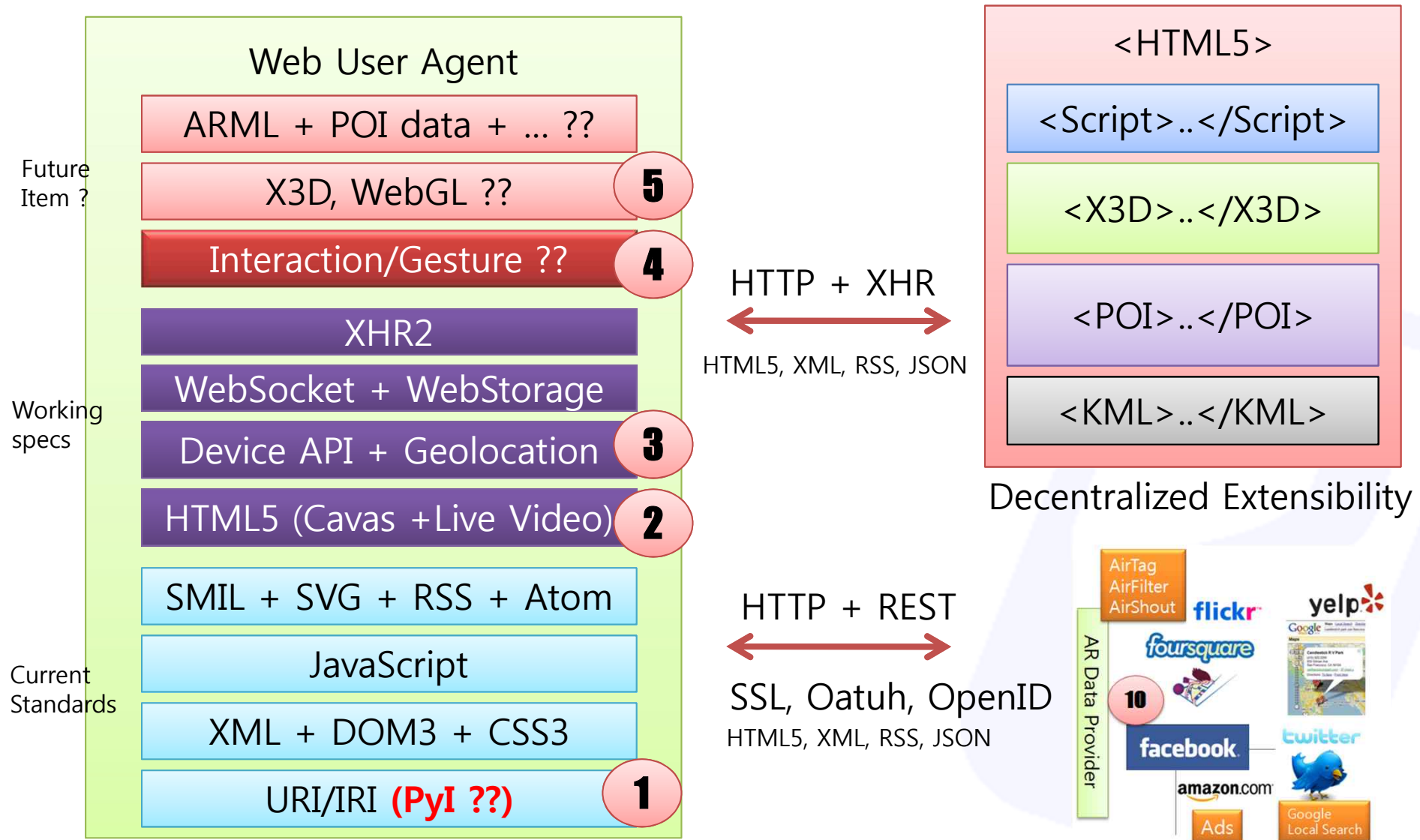
AR Interoperability Issues

1. AR Contents Markup & Format
2. AR contents Transport/Interaction method
3. Representing 3D Interactive AR/MR Contents
4. Event Scripting Engine
5. Local Caching method
6. Additional functionality of AR Agent
7. Device Capability Access APIs
8. AR Data Mashup method
9. AR Data Format – POI(images, text, 3D models, URLs), Person..
10. AR Data Service API
11. Open Marker Database
12. Security & Privacy

Web Application Architecture



AR on the Web - W3C's point of view



Conclusion - AR/MR standardization

❑ Made further efforts

- Organize the new group (IG or WG)
- Develop the standards for AR on the Web

❑ Working items

- HTML5 : Live Video Streaming (& codec)
- Device API : Camera API (to control Live Video), Geolocation API
- Web Application
 - Widget, XHR2, Web Socket, Bidirectional connection (IETF)
- New Working Group's item ?? - AR/MR on the Web
 - PyI (Physical Object Identifier)
 - Registration & 3D object integration (with HTML5)
 - Interaction & Event Processing (with HTML5)
 - Representation of Augmented Link (POI marking, AirTag ...)
 - AR Ontology (metadata processing)

Conclusions

- ❑ AR related standardization activity in another bodies
 - ISO/IEC JTC1 SWG-planning
 - Korea National Representative – Propose to new work scope (AR) on JTC1
 - ISO/IEC JTC1 SC24
 - Hajin Kim (SC24 chairman)
 - Jeonghyun Kim (Korea Univ.) - Representing 3D interactive AR/MR contents (WG6)
 - WoonTaek Woo (GIST) – Collada extension for AR (WG6)
 - Korea National Representative - Proposal for New AR WG (maybe WG9)
 - OMA CD WG – Mobile AR
 - LG Electronics, Enswers, ETRI, Olaworks, AT&T
- ❑ ETRI has been coordinating these activities (in Korea)
 - We were already organized to AR standardization workshop twice
 - 1st AR/MR Standardization Workshop, (POSTECH, April 23, 2010)
 - <http://www.w3c.or.kr/~hollobit/ARKR/201004-workshop/>
 - 2nd AR/MR Standardization Workshop,(KIST, June 3, 2010)
 - <http://www.onoffmix.com/e/hollobit/1571>
- ❑ ETRI will fully support to W3C's AR on the Web activity.

Thank you

For more discussion :

JongHong Jeon (hollobit@etri.re.kr)
+82-42-860-5333

Blog : <http://mobile2.tistory.com/m>
<http://twitter.com/hollobit>



OR

