

An Enhanced Interoperability Architecture to Enable Universal Access to ATMs

Workshop on Self-Service Terminals
and Assistive Technologies

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Defining factors for Human-ATM interaction

The traditional interaction between humans and ATM devices is based on the manual operation of a **tangible interface** and the movement of objects within a **secure environment**.

This interaction pattern poses some serious challenges for **people with special needs**, who face design and technological barriers that mostly exclude them from using ATM devices.

Barcelona Digital is providing some relevant background work to address this topic:

- by conducting the research study ***Accessibility on ATM devices***, Serra et al.(2006) with the participation of “la Caixa”, which offers design guidelines for the construction of accessible ATMS.
- by participating in the ***INREDIS*** Project, focused on developing an interoperability and accessible framework to improve daily activities of people with disabilities.

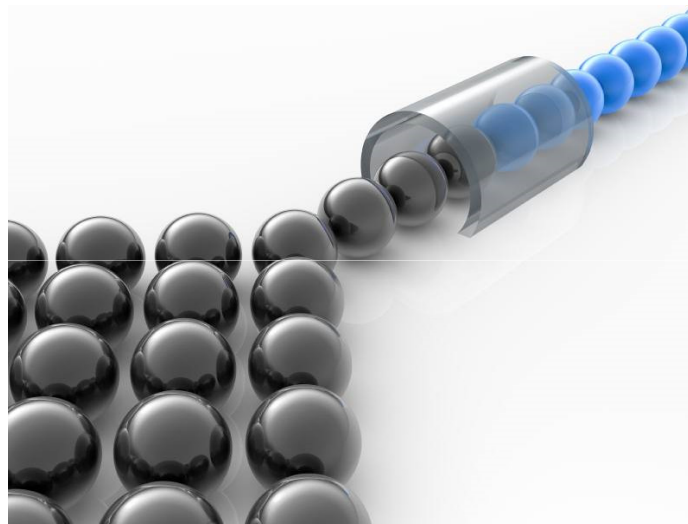


inredis

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Interoperability Architectures to Improve Accessibility

State of the Art **Interoperability Architectures** offer a technological approach to overcome these accessibility barriers: a common gateway to allow the operation of heterogeneous electronic devices, such as the whole range of ATMs, **from a single controller element and through an adapted user interface.**

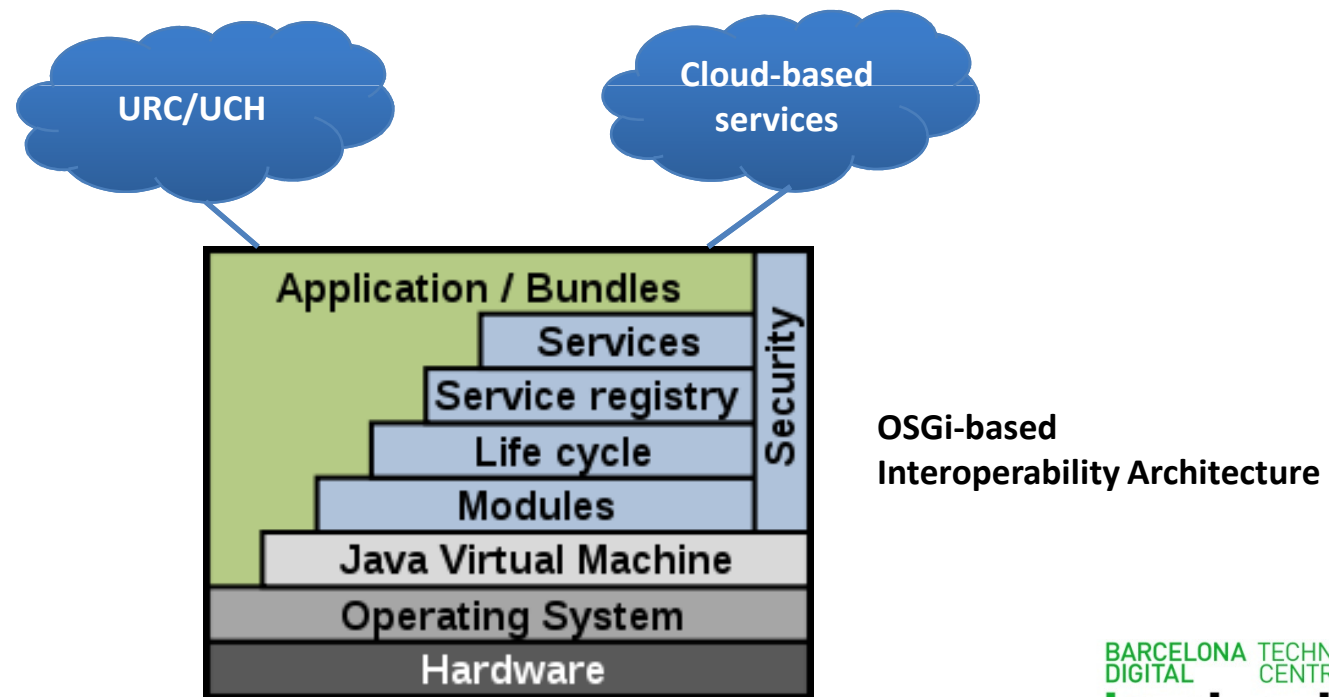


Recent research has proved the *Universal Remote Console* Architecture specification and its implementation **Universal Control Hub** as the most relevant ongoing initiative on Interoperability. URC/UCH is aimed to create a general architecture framework for device interoperability and **accessibility for all.**

Expanding the scope of URC/UCH within SOA

However, this Interoperability Architecture, which has been developed for home automation scenarios, show some **critical lacks** that diminish its potential applicability on **complex scenarios** such as those involving the operation of ATMs.

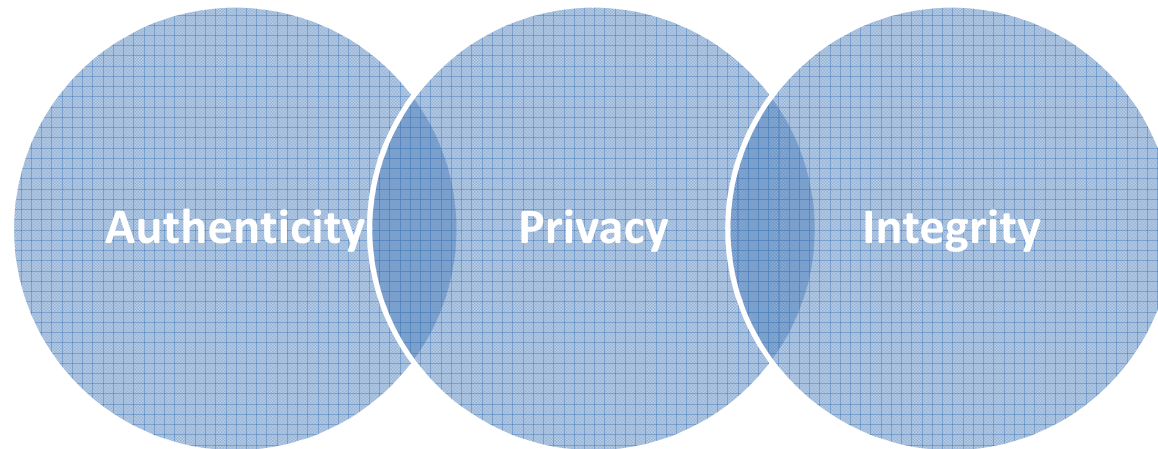
The integration of the Interoperability Layer within a **Service-Oriented Architecture**, such as OSGi, provides a modern approach to boost the potential system capabilities and get through these lacks. That Service Integration Gateway also enables **bi-directional operation within cloud-based environments**.



Adding Security to Service-based Interoperability

Security is the key issue to be tackled when designing Information Systems focused on managing financial transactions. Within that context, a proper **End-to-End Security Infrastructure** must be built on Interoperability Architectures for ATM operation.

This Security Infrastructure is intended to provide the required **authenticity, privacy and integrity** levels without compromising the system accessibility.



Building this Infrastructure requires a combined set of actions focused on the **enhancement of the URC/UCH** implementation, the deployment of secure communication channels and **data encryption capabilities**, a proper application of **SOA security patterns** and the integration of **cloud-based federated** security services.

Adapting Interaction Model to User Needs

Universal Access to ATMs is built on **Adaptive User Interfaces**. On top of the Technical Interoperability Architecture, the User Interface Layer must provide a **Smart management of Human-Computer Interaction** to make Universal Access real.

User needs and device capabilities must be properly characterized through **ontological models**. Applying reasoning on models and **context management**, the systems decides which interaction model fits best user needs and renders the adaptive interface for that model:

- visual interfaces
- speech-based interfaces
- avatar-based interfaces for sign language
- haptic interfaces



Thank you!

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