

Realizing the Plug and Play dream in the home network

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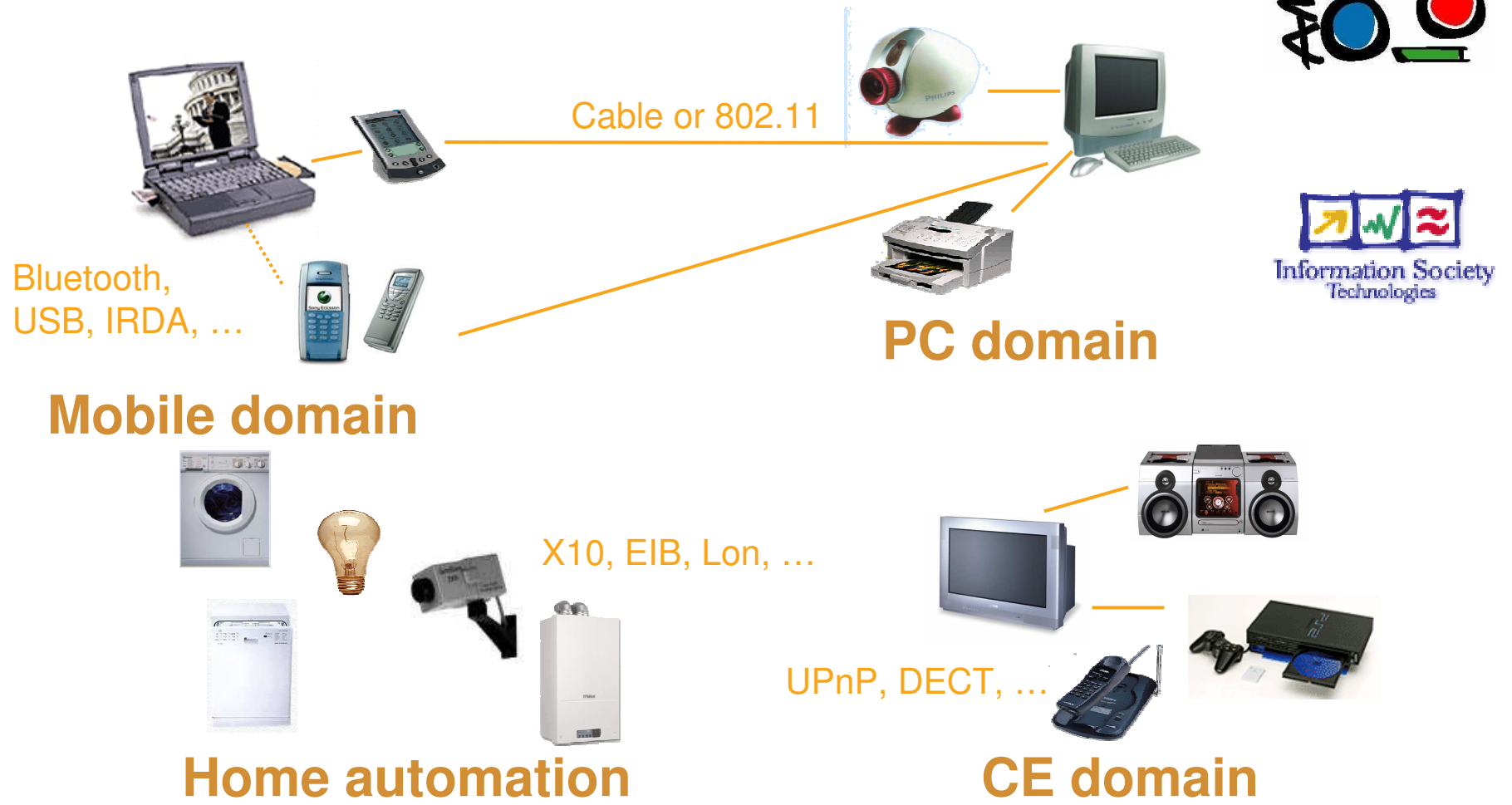
Summary

- Application design in the Home Network
 - The home network
 - A platform-centric vision
 - Pervasive computing
- The OSGi™ platform: designed for pervasive environments
 - Handling dynamicity: Declarative Services, iPojo, Spring.
 - Handling distribution: Device Access and Discovery Base drivers
 - Handling heterogeneity: Adaptors facing interface fragmentation
- Beware of the power of OSGi™ technology!
 - The 13 fallacies of pervasive computing

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Application design in the Home Network

The home network

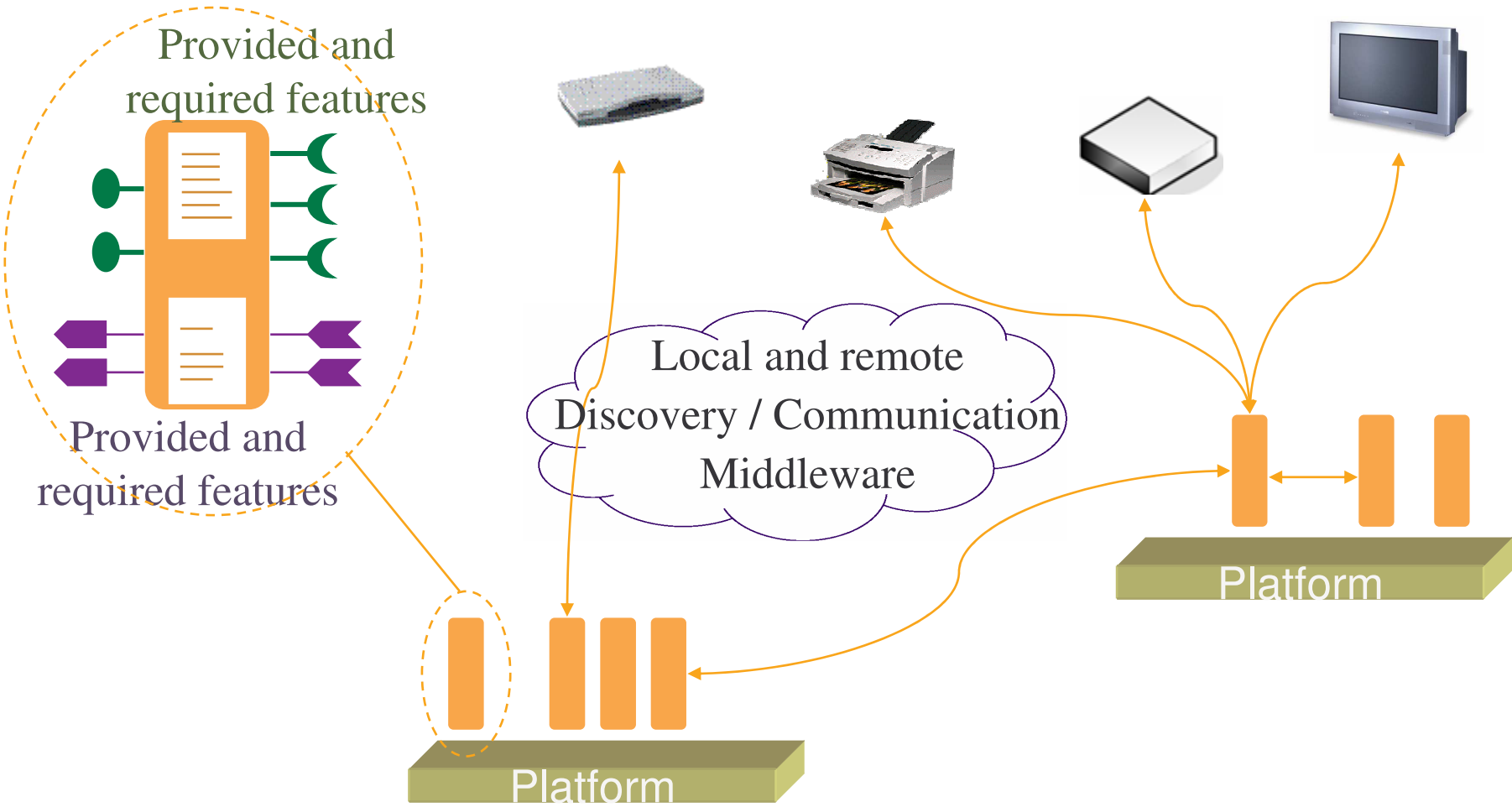


Pervasive Computing

- Challenges in the pervasive environments
 - Dynamicity: Automating the contextual vision of the home
 - Device context: Device availability, capacities, location.
 - User context: location, activity.
 - Distribution: making local and distant access transparent
 - Heterogeneity: turning heterogeneous entities into uniform interfaces

⇒building an architectural vision to face the challenges

A platform centric vision

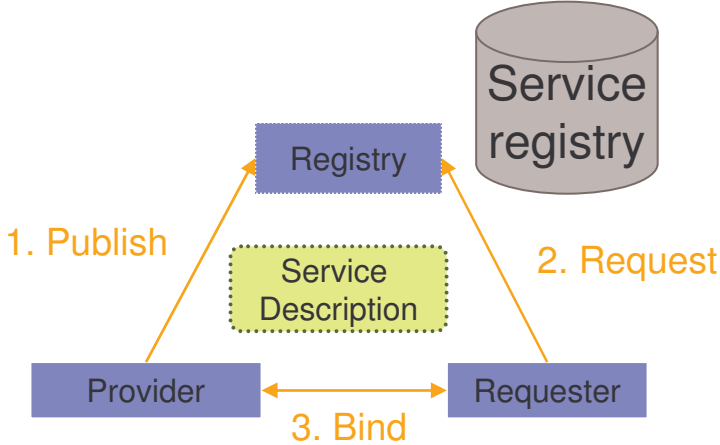


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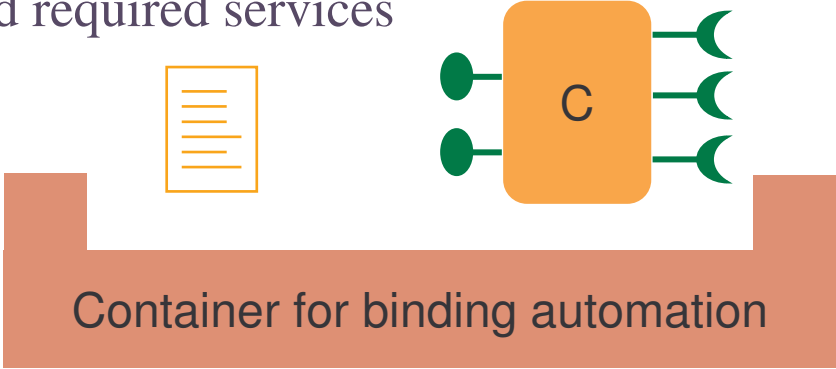
The OSGi™ platform: designed for pervasive environments

Handling dynamicity

- Techniques based on service and component orientation



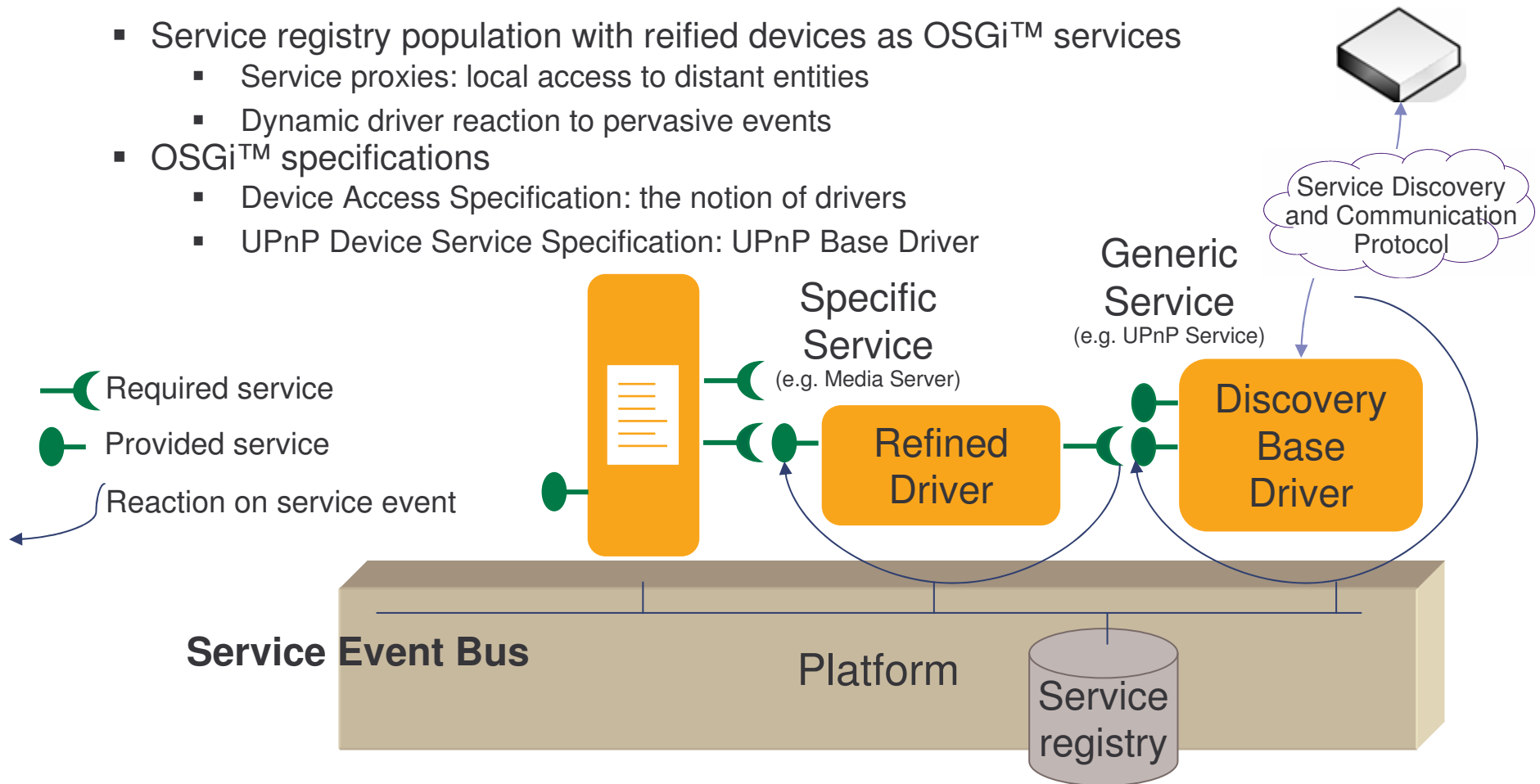
Self-description of provided and required services



- Available solutions on top of the OSGi™ framework
 - OSGi™ Declarative Services (former Service Binder)
 - iPojo
 - Spring-OSGi™
 - Newton

Handling distribution

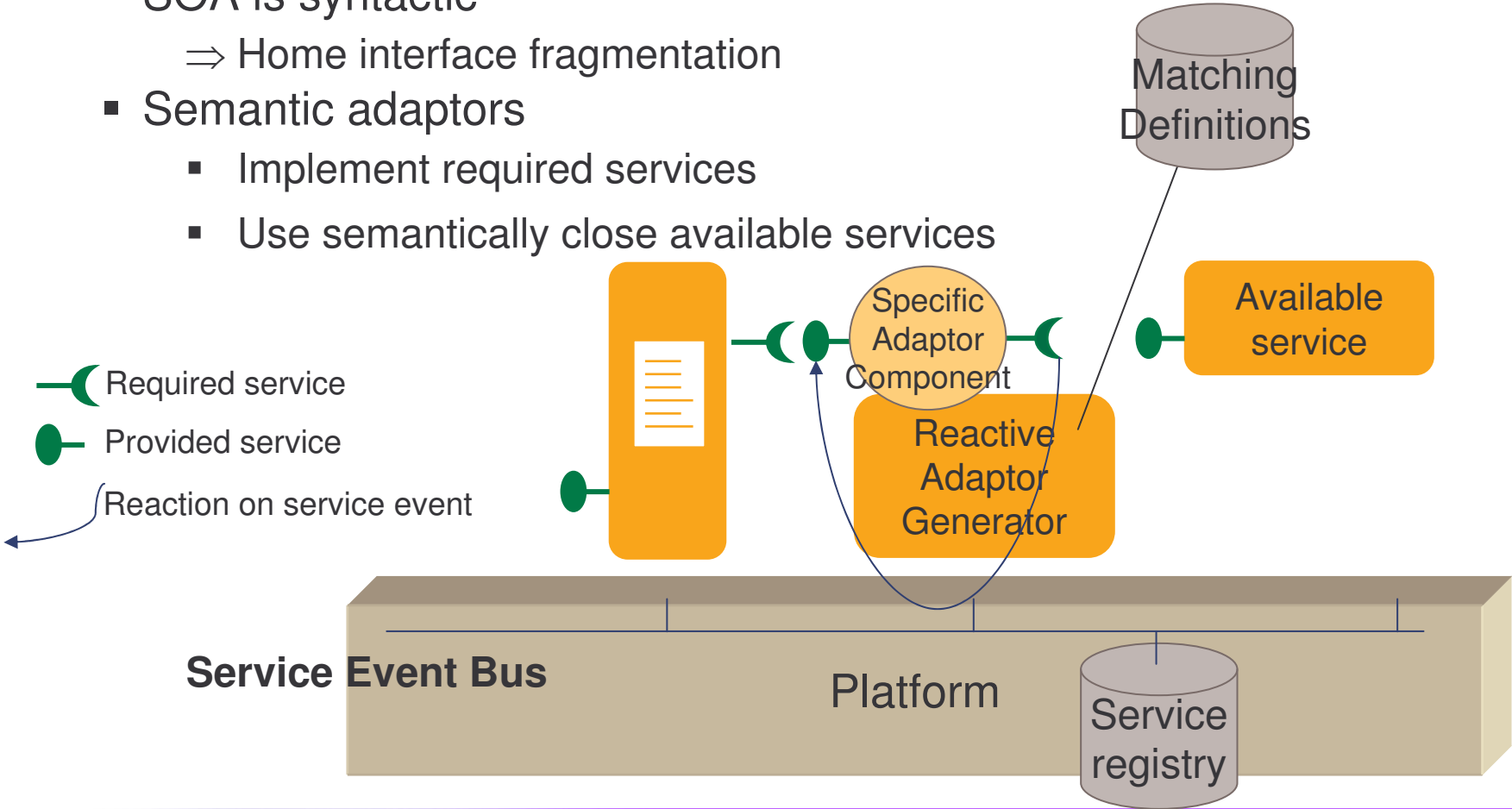
- Service registry population with reified devices as OSGi™ services
 - Service proxies: local access to distant entities
 - Dynamic driver reaction to pervasive events
- OSGi™ specifications
 - Device Access Specification: the notion of drivers
 - UPnP Device Service Specification: UPnP Base Driver



Provided services

Handling heterogeneity

- SOA is syntactic
 - ⇒ Home interface fragmentation
- Semantic adaptors
 - Implement required services
 - Use semantically close available services



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Beware of the power of OSGi™ technology!

The 13 fallacies of Pervasive Computing

- Masking difficulties at language level is not all !
- Here are the naive assumptions of new developers

1-8. Peter Deutsch's eight fallacies of distributed computing

- <http://blogs.sun.com/jag/resource/Fallacies.html>

9. Services are available at once
10. A discovered service is available in the long run
11. A service has got no state
12. All service interface methods are implemented
13. Used services are known at development time

⇒ OSGi™ technology only reduce code complexity. Dynamic, distributed and heterogeneous aspects must be accounted for at design time.

Conclusion

- OSGi™ technology facilitates home applications development
- However, keep in mind the rules of Pervasive Computing !

- Ready to fill your house with plug-n-play devices ?



References

- Technical and Scientific litterature
 - André Bottaro, Anne Gérodolle, Philippe Lalanda, *Pervasive Service Composition in the Home Network*, 21st Int. IEEE Conference on Advanced Information Networking and Applications (AINA-07), Niagara Falls, Canada, May 2007
 - Clément Escoffier, Richard S. Hall, *Dynamically Adaptable Applications with iPOJO Service Components*, 6th Int. Symposium on Software Composition (SC 2007), Braga, Portugal, March 2007
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- OSGi™ R4 Core specification and compendium
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