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## ***Management of Smart Spaces***

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## **Telecommunications Software Systems Group**

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- Established 1996
- 15 active funded research projects
  - Basic research: HEA, SFI
  - Applied Research: EU FP5/6, IE, special initiatives
  - Experimental Development: IE, direct funding
- 50 employees
  - scientists, software developers, WIT Faculty, administrative staff, PhD and MSc students
  - Currently recruiting PIs and PostDocs

## **TSSG Co-operations / Partners**

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- Co-operations with R&D institutions
  - Irish: UL, UCD/DCU, CIT, TCD, NMRC
  - International: LIP6/Evry CNRS, FhG FOKUS, TU Berlin, UCL, U Surrey, UC3, UoR CRMPA, Eurescom
- Co-operations with industrial partners
  - Irish: Ericsson, Vodafone, Motorola, O2, Eircom, Lake
  - International: Atos, UHC, Sun, Intel, Lucent, Telefonica, TTL Labs (China), Siemens (Portugal, Italy)
- Co-operations with standard bodies
  - ETSI, TMForum

## **TSSG's Vision and Mission**

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- The long-term **vision** of TSSG in short is to develop
  - Develop a framework for *autonomic services*
  - allowing for *ubiquitous service solutions*
  - Over a *virtual* communications infrastructure
- The **mission** of TSSG comprises three parts:
  - to promote autonomic paradigm in mobile communications and ubiquitous computing
  - to strengthen the Irish influence in telecommunications
  - evolution of the group to first class research institute within the telecommunications

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## M-Zones – Managed Zones Research Programme

## **M-Zones**

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- [www.m-zones.org](http://www.m-zones.org)
- 4 year basic research programme, started 08/02
- Funded by HEA with 2.5 Mill €
- Partners: WIT (prime), TCD (Dublin), CIT (Cork)
- Comprises approximately 30 researchers (postgraduates, PhD students, PostDocs, PIs)
- We are now in the second year
  - State-of-the-art → promote our vision
  - Separated testbeds → integrated testbeds
  - Individual publications → establish international WS

## **M-Zones – Objectives**

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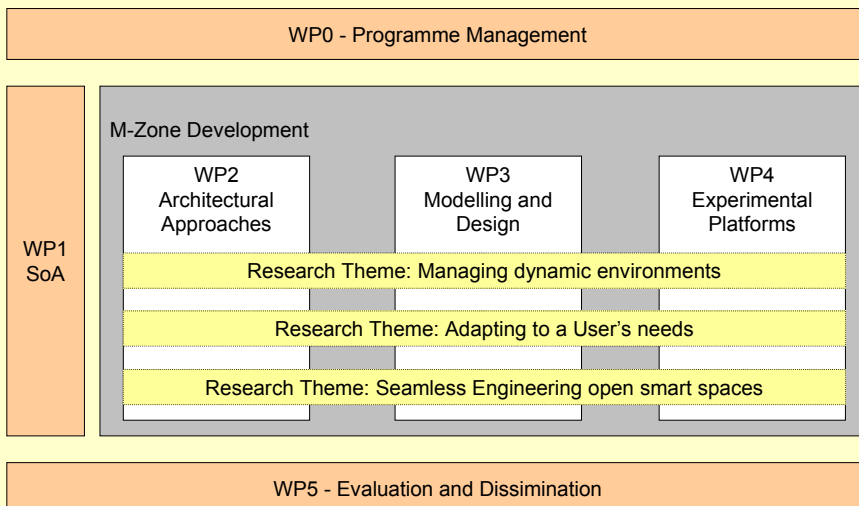
- Understand the basic problems for Smart Space Management
- Develop a holistic view of Smart Space Management
- Provide insight into technologies and infrastructure
- Integrate static and dynamic aspects of Smart Spaces
- Develop Smart Space management framework
- Contribute directly to Standard Bodies
- Foster collaboration between research groups
- Enable exchange of researchers
- Produce high-quality publications

## M-Zones – Why do we do that???

Because traditional solutions won't work:

- Far greater degree of dynamism & heterogeneity
- A blurring of division between control plane, management plane and service-logic / knowledge
  - the objects are getting smarter!
- Unlikely to be realised via single uniform middleware/computing infrastructure

## M-Zones – Programme Structure



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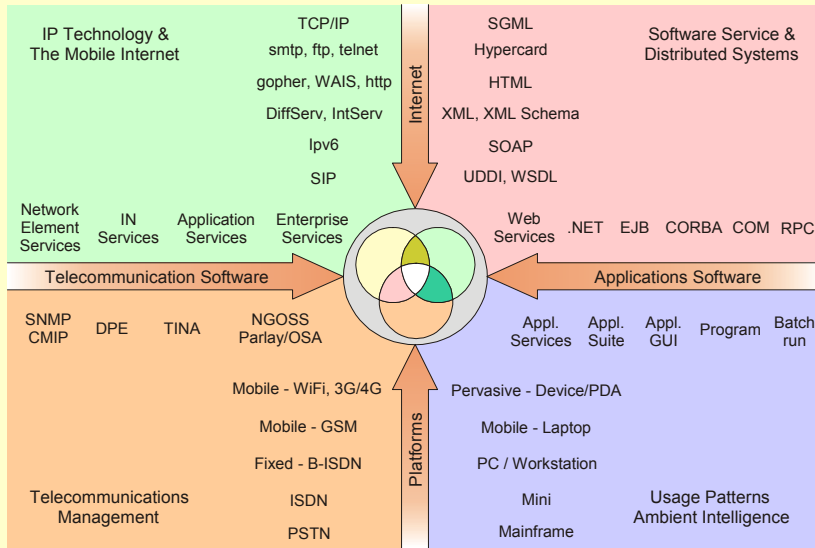
# Managing Smart Spaces

## ***Management of Smart Spaces – Context***

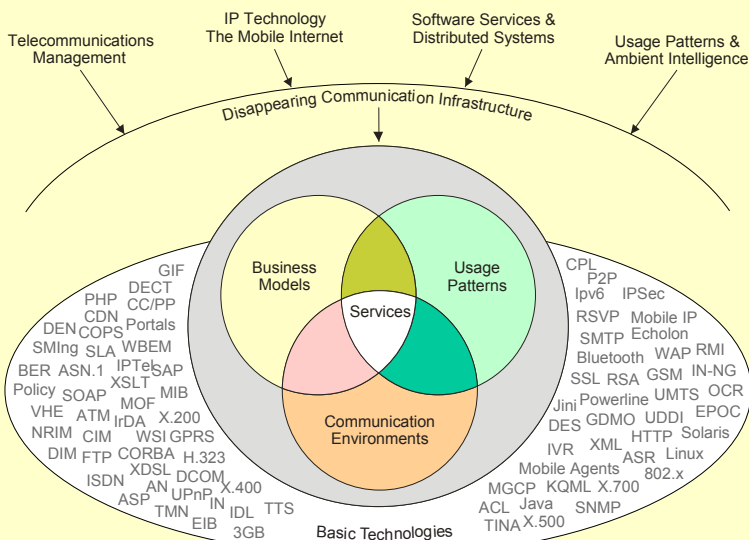
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- Smart Space  
A Smart Space is a *physical space* rich in *devices* and *services* that is capable of interacting with *people [aka users]*, the physical environment and services originated outside this very Smart Space. The aim of the Smart Space is to orchestrate the use of integrated physical and computing environment to bring tangible benefits to people in support of their tasks.
- Managed Zone (M-Zone)  
An M-Zone denotes a domain for the management of one or more Smart Spaces, unrelated (at least a priori) to a physical space or organisational boundary.

# M-Zones – Scientific and Technical Environment



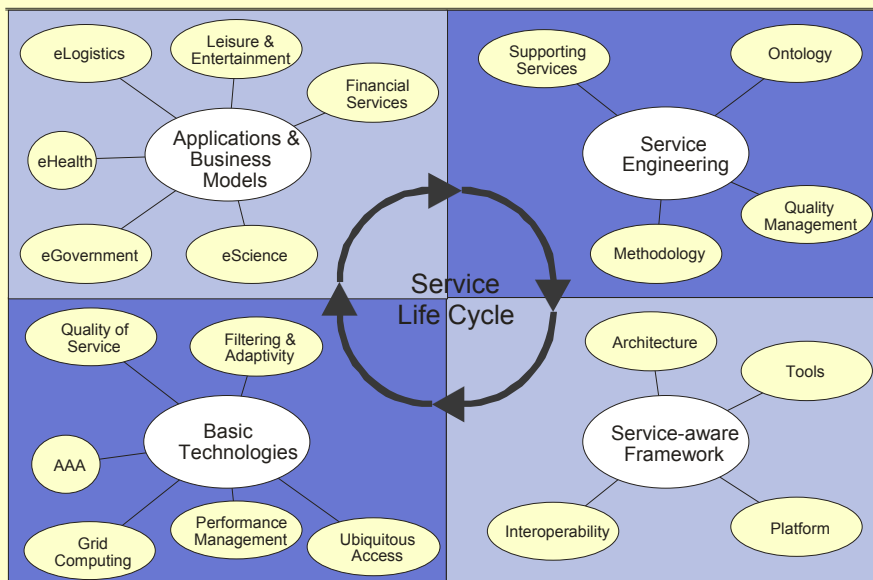
# M-Zones – Research Challenges



## M-Zones – TSSG Research

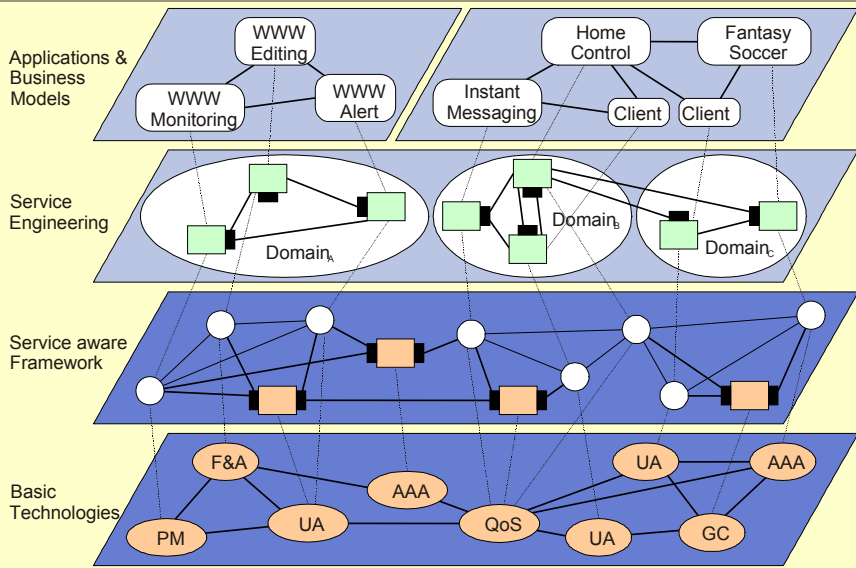
- Design Principles for Managed Zones
  - Information and Behaviour Modelling
  - Policy-Knowledge Continuum (business2network translation)
  - ➔ Autonomic Management (Automated Process Management)
- Specific Research Topics
  - Management Functionality for Pervasive Computing Environments
  - Standards-based Information/Data Model for Personal Information System
  - Dynamic adaptation of security policies, with contextual information as the catalyst
  - Semantic Service Discovery and Task Driven Service Composition

## M-Zones – Modelling



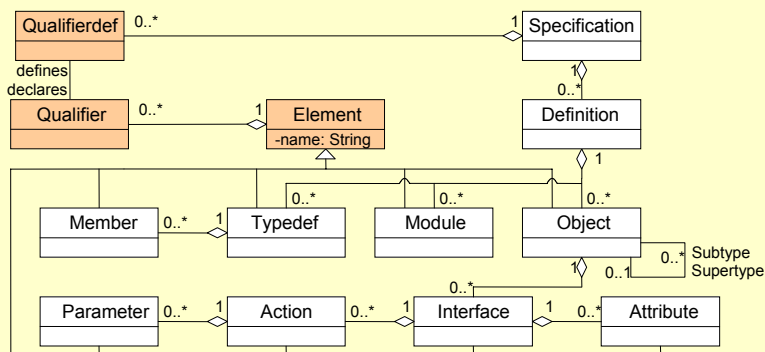


## M-Zones – Translation



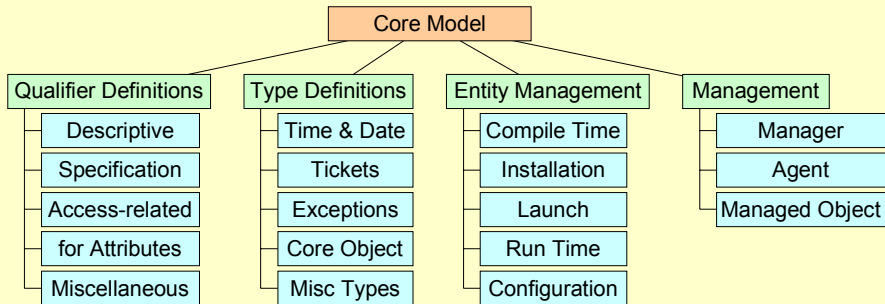
## M-Zones Examples – Meta Modelling

- Basis for the description of application objects
  - Must cover static *and* dynamic aspects



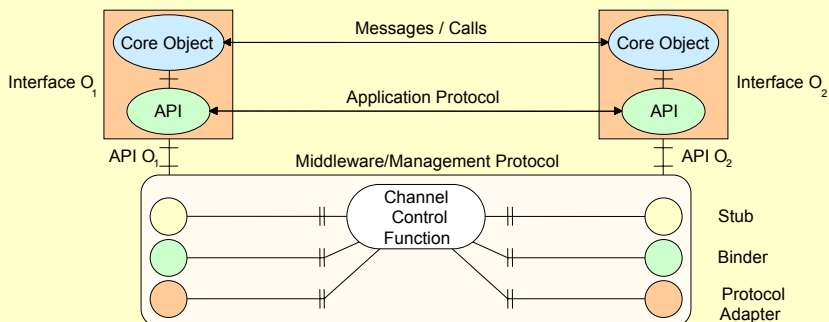
## M-Zones Examples – Information Modelling

- Reasonable set of information for building repositories
  - identifies type definitions, e.g. time & date
  - Common information / ontology for standardised information exchange

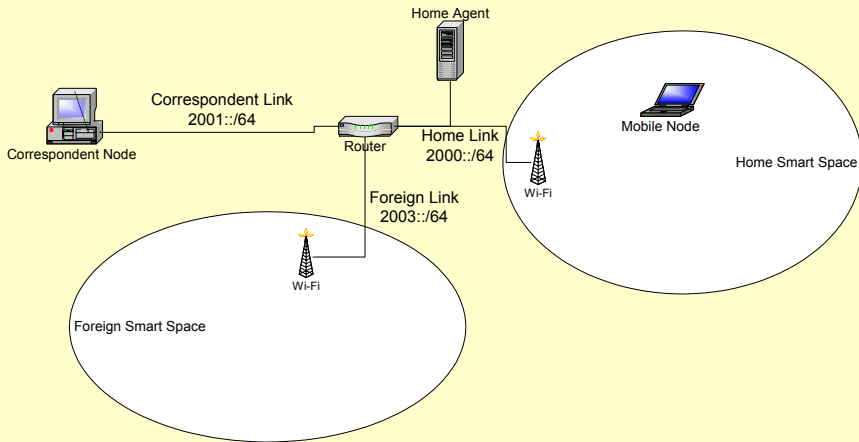


## M-Zones Examples – Protocols and APIs

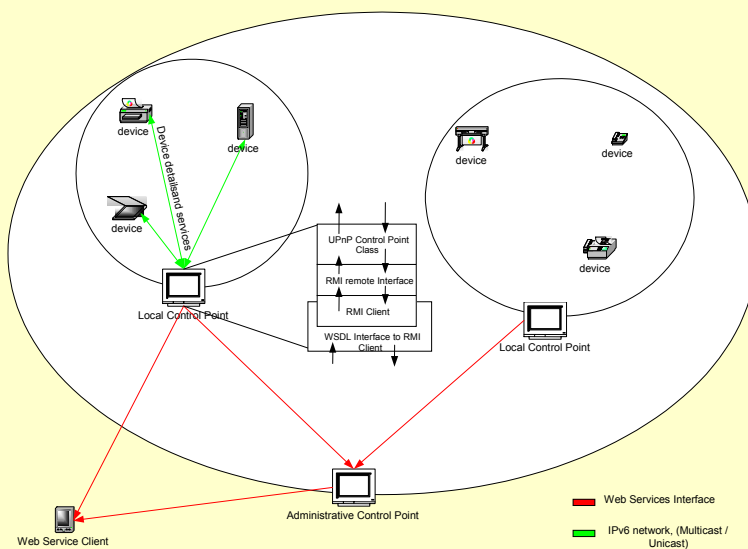
- Protocol defines rules for exchanging information
  - decouple applications from middleware/management technology
  - simple interface hiding complexity



## M-Zones Examples – Mobile IPv6 Infrastructure



## M-Zones Examples – Access Control



## Conclusion

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- Framework for use, control and management of Smart Spaces
  - Information Modelling, Behaviour Modelling
  - Policy-Knowledge Continuum
  - Experimental test-beds and simulations
- Combination of theory and practice
  - Framework as theoretical background
  - Information models as realisation for specific businesses
  - Implementation as lightweight, open and smart solution
- Co-operation with LIP6/Evry CNRS
  - Exchange of researcher
  - Integration of M-Zones and Policy-based System → dynamics
  - Distributed Testbeds

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- Merci!
  - Additional information
    - [www.m-zones.org](http://www.m-zones.org)
    - [www.tssg.org](http://www.tssg.org)
    - [vdmeer@tssg.org](mailto:vdmeer@tssg.org)