



D5.1 Evaluation and Dissemination Report

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Release: 1.0

Date : 2005-05-12

Distribution : Public

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1 Introduction

This document provides an initial evaluation and dissemination report for the M-Zones programme. This report is in essence a summary of the outputs of the project to date. The plan is to make the next report in this series look at a scenario-based evaluation methodology that is being developed by the M-Zones team D5.2, and the final report in D5.3 to be a final summary of all outputs and the application of the scenario-based methodology to these statistics.

1.1 Terms and Reference

This text is extracted from the *D0 M-Zones Programme Work Plan* (Last updated 2004-09-03).

WP5 – Evaluation and Dissemination

The final work package of the programme will collect together the evaluation aspects of the entire programme. This is preferable to individual, per-package evaluation tasks as it allows the results of experiments to be analysed against a complete set of deliverable technologies.

Evaluation will be based around a set of scenarios – “stories” describing possible interactions with a smart space. These should be based on the common problem domain scenarios used in WP2. Each scenario will be explored using the different techniques under investigation: modelling, simulation and (where possible) implementation.

For example, one core scenario involves student interaction with a wireless teaching environment. Modelling this system allows us to locate the scalability (and other) boundaries of the system; simulation allows us to test it against varied sizes and behaviours of student populations under controllable conditions; implementation removes the predictability and provides for extra phenomena to be discovered in real life.

This work package is also responsible for the dissemination of the project results through conferences, workshops and journals as well as through submissions to key standardisation work. In addition an interactive website will be developed to support interaction between the project and other internally renowned research teams within the area of smart space management. By its nature the identification of the dissemination channels is well be carried out in real time. At the end of each year a report will be produced in the form of a deliverable indicating the dissemination activities carried out within the previous 12 months.

Deliverables (Number, Due time in months from programme start):
D5.1 (T0+28): Initial Evaluation and Dissemination Report
D5.2 (T0+35): Intermediate Evaluation and Dissemination Report
D5.3 (T0+44): Final Evaluation and Dissemination Report

As discussed above, D5.1 is in essence a summary of the outputs of the project to date. D5.2 will be a scenario-based evaluation methodology that is being developed by the M-Zones

team, and D5.3 will be a final summary of all outputs and the application of the scenario-based methodology to these outputs.

2 Evaluation

The progress of the M-Zones programme to date has been measured by a series of formal reports to the HEA, which address financial details, publications and documentation of ancillary activities such as outreach. In this deliverable we augment this reporting by focussing on the evaluation of the research outputs of the programme by the partners. We first discuss the primary evaluation criteria that have been used to date by the partners and outline how research outputs have been measured against these criteria by the individual partners.

2.1 Research Questions

Within the first two years of the M-Zones programme, each of the partner institutions was following a number of specific research questions. These research questions show the individual interest of groups within WIT, TCD and CIT. In combination, these research questions indicate towards what direction the M-Zones programme has evolved. M-Zones deliverables and peer reviewed publications show then the actual results of the conducted research.

Partner	Area	Research Question
WIT	Infrastructure	How can we overcome the lack of Smart Space management infrastructure to support converged IPv6 networks?
	Telecommunication Management	How do we manage interoperability to provide seamless roaming for users and resources?
	Information Modelling	Personal Information Management in Pervasive Environments
	Policies	dynamic adaptation of security policies in pervasive environments, with contextual information as the catalyst
	Resource Control	Task management for pervasive environments
TCD	Adaptive Behaviour	The level to which adaptive behaviour of ubiquitous computing systems can be constrained to meet to needs of users, individually and collectively
	Knowledge-based Systems	The level to which the inherent heterogeneity of ubiquitous computing systems can be overcome by knowledge-based systems engineering
	Ontology	<i>Interest:</i> using ontologies, reasoners etc in building smart spaces <i>Challenge:</i> applying ontologies in a way that is useful for building smart spaces for effective use of runtime intelligence
CIT	Adaptive Mechanisms	Which adaptive mechanisms are most suited to enabling a self-configuring and self-optimising smart space communication infrastructure whilst considering operator and user requirements?
	Miniaturisation	What is the extend by which miniaturised sensor networks can support knowledge engineering?
	Technologies	Which technologies are suitable for deployment, discovery, and delivery of services in ubiquitous computing environments?

2.2 Research Topics

The research work within the M-Zones programme can be best displayed by means of axis diagrams. These diagrams show the interest of partners for a variety of research topics from the original M-Zones proposal (Figure 1), the actual M-Zones work programme and the finalised deliverables (D0, Figure 2) and the characteristics of Smart Space Management (Figure 3). The axis diagrams indicate the progress of the M-Zones programme and indicate the individual developments/expertise per partner as well as they give an overview of the combined interest and developments of the overall programme.

Figure one shows the expertise per partner of the research areas described in the original M-Zones proposal. The expertise is given by means of weak, weak-medium, medium-strong and strong competence. As the diagram shows, there is a reasonable distribution of strong interest among the five research areas. Each of these areas is covered by one partner with strong interest. WIT and TCD focus mostly on software related work items, whereas CIT brings in a strong interest into hardware supported by WIT's strong interest into networking issues.

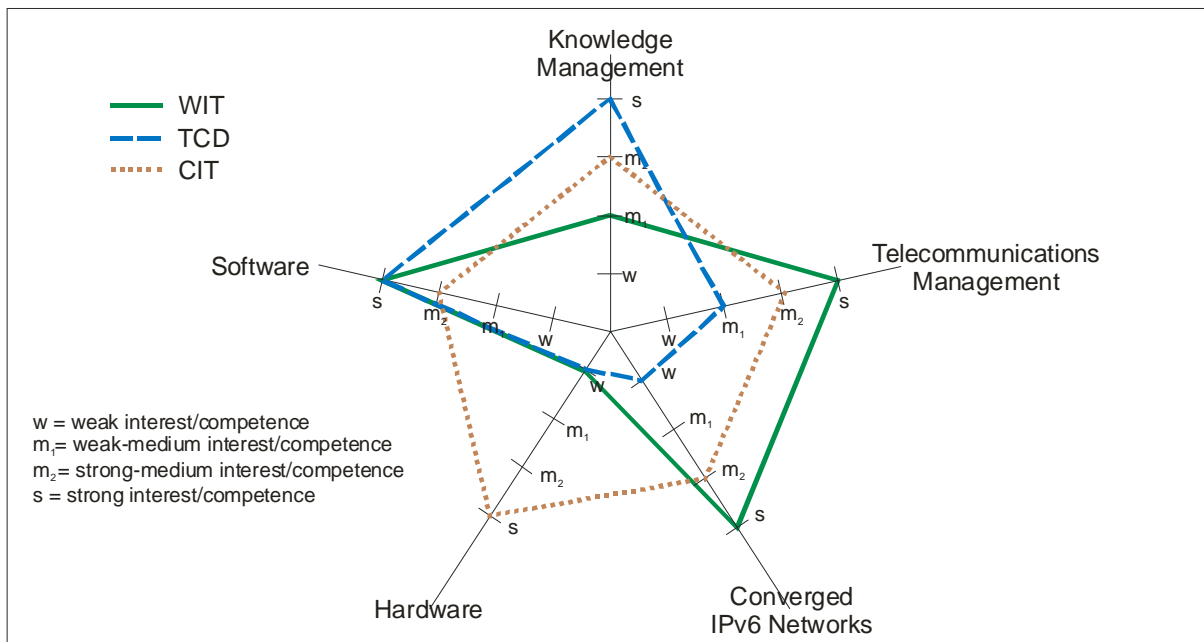


Figure 1 – Research Interest, original proposal

Figure 2 shows the axis's with regard to the three major work packages of the M-Zones work plan. Each of the work packages has been further divided into two main areas, such as Business/Organisational and Logical/Structural for work package 2. The axis's are characterised with the similar to figure 1, providing information about the partners interest by means of weak, weak-medium, medium-strong and strong.

As this diagram shows, the work package leader have the strongest interest in their area (e.g. TCD for WP2, WIT for WP3 and CIT for WP4), though all WPs are supported by at least one more partner with strong or medium-strong interest. This overlap was used during the first two years to initiate and to conduct joint research across the boundaries of partner institutions (as can be seen by joint publications and specific joint research projects).

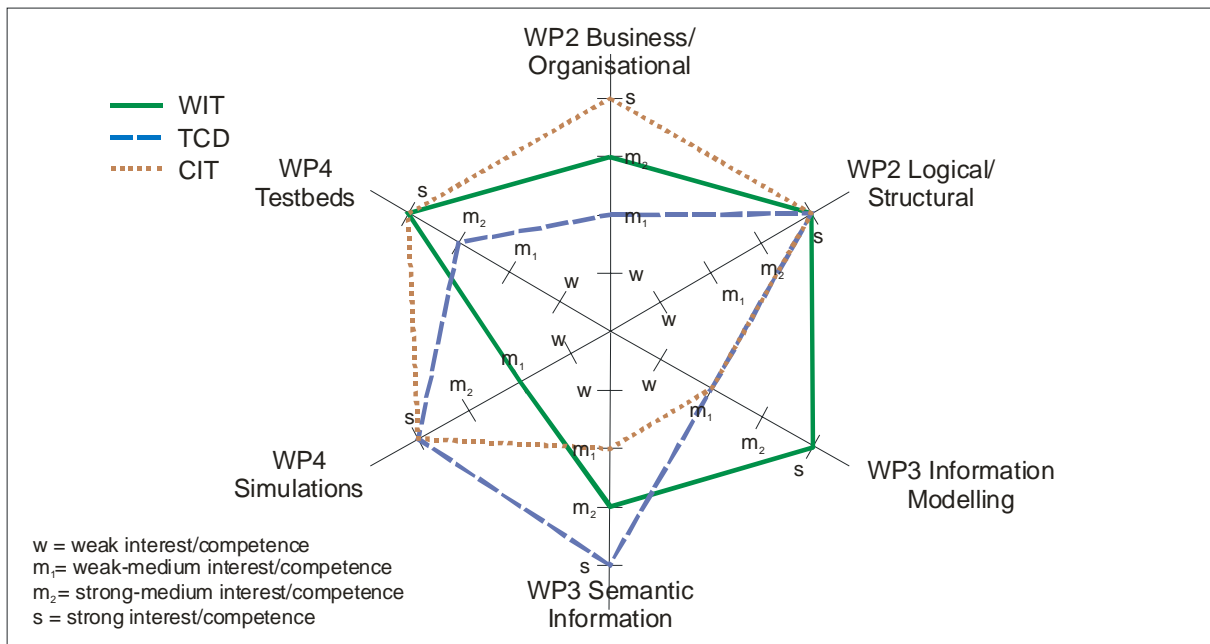


Figure 2 – Research Interest, work plan and deliverables

Figure 3 provides information about how the M-Zones partners would characterise Smart Space Management. This diagram depicts four main aspects of this management, namely the Organisational Model, the Management System, the Technical Infrastructure and the Location of intelligence.

Looking at figure 3 only, we can see that:

- The most settlement is in the location of intelligence and in the technical infrastructure
- The most disagreements are within organisation models and the characteristic of the actual management system
- All partners think about Smart Spaces in terms of heterogeneous systems, basically of a small to large scale
- The intelligence is located either on the user side or, to a certain degree, embedded within the Smart Space

Looking at this diagram having figure 1 in mind (research areas from the original proposal) it can be summarised as follows:

- WIT perceives that organisational models are more tightly defined than loosely defined (looking mostly on office environments), that the management system is less distributed than centralised (coming from a telecommunications perspective), that the technical infrastructure is heterogeneous on a small scale and that the intelligence is mainly located at the users' end.
- TCD perceives that the organisation models are completely loosely defined (looking mostly on e-learning environments), that the management system is completely distributed (coming from a software perspective), that the technical infrastructure is heterogeneous on a small scale and that the intelligence is more embedded within Smart Spaces.
- CIT perceives that organisational models are neither tightly nor loosely defined (looking mostly on home environments), that the management system is more distributed than centralised (coming from a hardware perspective), that the technical infrastructure is

heterogeneous on a small to large scale and that the intelligence is located at the users' end or might be embedded within a Smart Space.

Analysing these views we can see that:

- Organisational models are loosely defined within software systems, tightly defined within telecommunication management systems and defined to a certain (appropriate) degree within hardware and networks.
- Management systems are distributed within software systems, more centralised within telecommunication management (but not totally centralised anymore) and more distributed within hardware and networks (but not yet totally distributed).
- The technical infrastructure is heterogeneous on any scale independent of the research area.
- The intelligence is located more towards the user (specifically for telecommunications management) and even for hardware and networks not completely embedded.

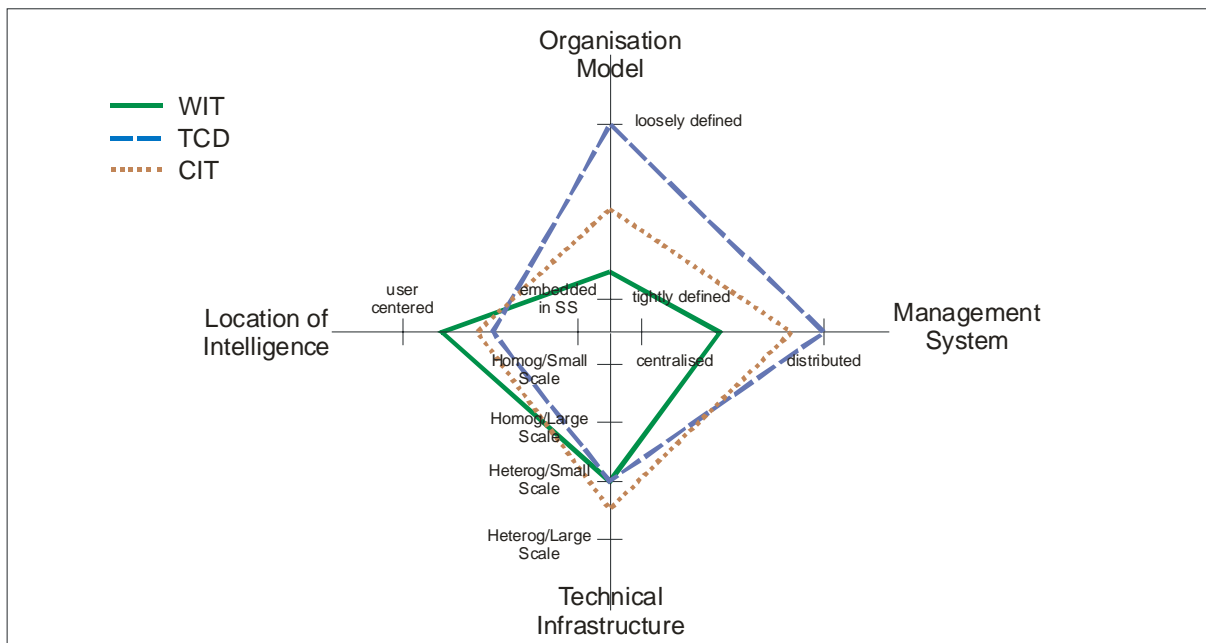


Figure 3 – Research Interest, Smart Space Management characteristics

Concluding the contemplation of the axis diagrams we can say that:

- Organisational model and logical structure of Smart Space management have their strongest interest from software/knowledge system and telecommunication management.
- Information modelling and semantic information are mostly supported by software/knowledge systems and telecommunication management
- Simulations and test beds are equally important for all research areas and for all partners.

2.3 Evolution of Smart Spaces and their Management

Another mechanism for evaluating the research of the programme is to take a look on the evolution of Smart Spaces, their characteristics and their management. We have selected three characteristics to show this evolution: Ad-hoc-ness, Adaptiveness and Heterogeneity. Figure 4

shows the current status of these characteristics by means of an axis diagrams, assuming that the original status before the M-Zones programme was 1 for all of the three characteristics.

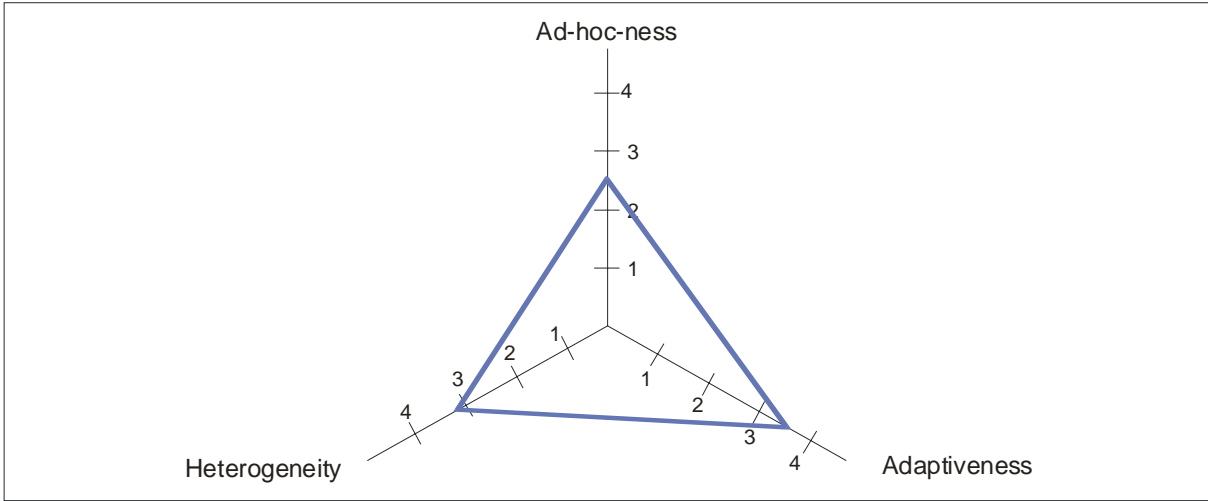


Figure 4 – Evolution of Smart Spaces and their Management

The metrics of this diagram are specified as follows:

Axis	Value	Meaning
Ad-hoc-ness	1	Group bindings controlled centrally
	2	Group bindings controlled locally with federation mechanism between locales supported
	3	Individuals perform group bindings
Adaptiveness	1	Monolithic – cost of change exceeds cost of original system
	2	Adaptable – cost of change managed through appropriate structuring
	3	Adaptive – change happens automatically at runtime
	4	Autonomic – automatic change is constrained by policies
Heterogeneity	1	Conformance to common global model required
	2	Conformance to organization / domain model required
	3	Anyone can use their own models

As the diagram shows, Smart Spaces, and even more important their management, evolved from central (ad-hoc-ness and heterogeneity) and monolithic (adaptiveness) systems towards almost individual-driven, almost autonomic systems with many specific models.

2.4 Publication Evaluation

Quality in all academic matters is usually a case for peer review. The M-Zones team have established an internal peer review process so that the outputs can be seen as having a hierarchy of quality checks, but even the entry point includes internal peer review with the M-Zones partners:

- M-Zones white paper (internal peer review multiple partners, iterative)
- National conference and/or workshop (externally peer-reviewed, once off)
- International conference and/or workshop (externally peer-reviewed, once off)

- Journal publication (externally peer-reviewed, iterative)

In addition, the plan has been to leverage the annual M-Zones workshop from a national to an international status in terms of the range and quality of the paper submissions, and for the papers submitted from the programme to directly compete with externally submitted papers of high quality.

This integrated strategy has enabled the M-Zones research programme to produce a very significant number of peer-reviewed outputs, with a gradation of scale. The procedures for evaluation of academic papers (and the exposure to external panels of experts in International conferences and Journals) is relatively well understood in the academic community, and there is little need to justify this approach here. Therefore this section summarised the total publications in terms of these quality levels.

M-Zones researchers have, from the start of the programme until the end of 2004, published 101 peer reviews papers in 3 journals and at 40 conferences (6 national and 36 international). The following table list all conferences:

Year	Short Name	Long Name	Org 1	Org 2	Typ
2004	eChallenges	eChallenges	EC	IST	int
	E-Learn	World Conference on E-Learning in Corporate, Government, Healthcare, & Higher Education			int
	HP-OVUA	Workshop of the 11th HP Open University Association	HP		int
	Hypermedia	Adaptive Hypermedia			int
	ICAC	International Conference on Autonomic Computing			int
	ICAP	12th International Conference on Antennas & Propagation	IEEE		int
	ICEIS	6th International Conference on Enterprise Information Systems			int
	Intermon	Inter-domain Performance and Simulation Workshop			
	ISSC	Irish Signals and Systems Conference	IEE		nat
	IST	IST Mobile Summit 2004	IST		int
	ISWCS	1st IEEE International Symposium on Wireless Communication Systems	IEEE		int
	IT Mgmt & T	4th annual Conference on Information Technology and Telecommunications	TecNet	CSSN	nat
		Annual Conference of the Irish Academy of Management			nat
	MUCS	Second International Workshop on Management of Ubiquitous Communications and Services	M-Zones		int
	NOMS	Network Operations & Management Symposium	IFIP	IEEE	int
	Policy	5th International Workshop on Policies for Distributed Systems and Networks	IEEE		int
	RAWON	IEEE Radio and Wireless Conference	IEEE		int
	SAC	19th ACM Symposium on Applied Computing	ACM		int
	VTC2004-Fall	60th IEEE Vehicular Technology Conference 2004-Fall	IEEE		int
	WAC	The 1st IFIP TC6 WG6.6 International Workshop on Autonomic Communication	IFIP		int

	Wireless	The 16th International Conference on Wireless Communications			int
2003	3G	Fourth International Conference on 3G Mobile Communication Technologies			int
	CIC	8th International Conference on Cellular and Intelligent Communications	IEEE		int
	DAIS	4th International Conference on Distributed Applications and Interoperable Systems	IFIP		int
	ED-Media	World Conference on Educational Multimedia, Hypermedia & Telecommunications			int
	E-Learn	World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education			int
	Hypertext'03	14th Conference on Hypertext and Hypermedia	ACM		int
	ICCT	International Conference on Communication Technology	IEEE		int
	IITE	International IT Events			int
	IM	IFIP/IEEE Eighth International Symposium on Integrated Network Management	IFIP	IEEE	int
	ISICT	International Symposium on Information and Communication Technologies	ACM		int
	IT&T	3rd annual Conference on Information Technology and Telecommunications	TecNet	CSSN	nat
	ITSRS	Telecommunications Systems Research Symposium	IEE	IEEE	nat
	MobiDE	3rd International Workshop on Data Engineering for Wireless and Mobile Access	ACM		int
	MUCS	First International Workshop on Management of Ubiquitous Communications and Services			int
	Wireless	The 15th International Conference on Wireless Communications			int
	WPMC	6th International Symposium on Wireless Personal Multimedia Communications	IEEE		int
	WWW	12th International World Wide Web Conference			int
2002	Eurescom	Eurescom Summit 2002: Powerful Networks for Profitable Services	ETSI	OMG	int
	IT&T	2nd annual Conference on Information Technology and Telecommunications	TecNet	CSSN	nat

Papers have been published in the following journals:

Year	Name	Publisher	Typ
2004	IEEE Wireless Communications Magazine	IEEE	int
2003	Radioengineering, Vol. 12, No.4		int
2002	Journal of Network and Systems Management, vol 11, no. 1		int

The following statistical information can be provided:

- 16 papers have been produced in cooperation with non-M-Zones researchers.
- 2 papers have been jointly written between M-Zones researchers.
- The overall rates are CIT: 49 papers, TCD 34 papers and WIT 20 papers (101 overall, two papers credited to two partners)
- The M-Zones participation on national conferences (IT&T 2002, IT&T 2003, IT&T 2004, ITSRS 2004) and conferences held in Ireland (MUCS2003, MUCS2004, ISCC 2004, ISICT 2003) rates at 50% (with 50 papers).
- IEEE, IFIP and ACM conferences rate with 42% (with 42 papers).
- EC and IST conferences rate with 5% (with 5 papers).

2.5 Demonstration Evaluation

In addition to the traditional use of academic publications as a quality metric for the research programme, M-Zones uses the development of separate and integrated prototypes as a way of validating the higher level modelling and architectural activity. The next deliverable in this series D5.2 outlines the methodology for the use of integrated scenario-based demonstrations as a mechanism for this.

3 Whitepapers

Whitepapers and State of the Art Papers have been written mostly by the postgraduate researchers. All of the whitepapers have been evaluated in an M-Zones internal peer review before they have been accepted for a deliverable. All whitepapers are part of one deliverable and are published on the M-Zones web server.

The internal review process has evolved over time. Starting with a very strict review, lasting for nearly three months for the state-of-the-art papers of Deliverable 1.1 and finishing with a more lax review for the Deliverable 2.3 & 3.3. This evolution took place due to two developments that happened within the first two years of the M-Zones programme:

- Postgraduate students became more mature in their writing
- Many whitepapers of the second half of this period have been submitted and accepted by peer reviewed conferences, thus minimising the effort that we had to spend for an internal review.

The following statistical information can be provided:

- Overall 43 whitepapers have been written
- 3 whitepapers have been jointly written by researchers from two partners
- 1 whitepaper has been written jointly with external researchers
- The overall rates are CIT: 14 papers, TCD 16 papers and WIT 15 papers.

The deliverables D1.1 (State of the Art), D2.1 & D3.1 and D2.3 & D3.3 have evaluated the quality of the whitepapers from the perspective of work packages. D1.1 provides the state-of-the-art paper as a collection of knowledge, classified into a number of areas with an

introduction for each area. This deliverable and its papers represent the starting point of the research work of the programme.

The deliverables D2.1 and 3.1 evaluate the early stage research work with given criteria's for the quality of the papers. The deliverables conclude that the papers cover a wide range of subjects and mostly domain specific solutions. All papers address the specific targets of the work packages, and all specific targets are dealt with within at least one white paper. Furthermore, D2.1 and D3.1 phrase some interesting and essential questions as result of the evaluation of the white papers:

D# Question

- D2.1 How can commercial mobile service providers use the integration of quality of service and novel applications to attract subscribers to use the unlicensed band in the face of free access competition?
- How does peer-to-peer and ad hoc networking impact on the design of application services?
- How can runtime bindings between services and different network types be effectively configured?
- How can knowledge be easily shared between individual developers and between software entities to avoid the constraints of slowly developed standards while encourage enough conceptual convergence to avoid a chaotic body of reusable knowledge?
- What level of commonality is possible or useful between knowledge-based representations of services, shared information and behavioural rules?
- D3.1 What is the underlying metaphor (paradigm) of a smart space that needs to be addressed by engineering managed zones?
- Can we identify a meta model for loosely coupled components that enables interoperability, scalability and portability of these components?
- To what extend do we need to incorporate semantic information into object models, repositories and formal notations?
- What are the novel management functions that are needed to use, operate, control, administer and maintain a smart space and a group of smart spaces?
- What services, protocols and formats must be provided by the underlying technical environment to enable managed zones?

Furthermore, the deliverables raised some questions about the quality evaluation process and about the research work within the programme:

- Refinement of quality criteria for the work packages
- Identification of a common layout and style for white papers (and general research papers)
- Agreement on a common terminology for managed zones
- Integration of (currently) individual research activities on institutional level as well as on the M-Zones programme level
- Definition of interfaces between the work packages for cooperation and to work package 1 for reuse and new input

At the next level, the deliverables D2.3 and D3.3 (beside evaluating the white papers against the developed criteria's) specifically addressed the raised questions and focused on a qualitative evaluation of the whitepapers regarding these questions:

D# Question

D2.3 *How can commercial mobile service providers use the integration of quality of service and novel applications to attract subscribers to use the unlicensed band in the face of free access competition?*

This question has to some extent already been bypassed by events, with a rapidly growing mixture of free, subscription and local payment WLAN access services being made available – so the market is now in a position to deliver its verdict.

How does peer-to-peer and ad hoc networking impact on the design of application services?

This question is of increasing importance as we examine ad hoc knowledge based routing for the communication of application-level information, and as noted above further work is required to determine if there can be fruitful reuse of ad hoc networking techniques, e.g. route caching, to the knowledge-based network domain. The impact of ad hoc networking on request-response style service is still not clear, though the clear need for dynamic service discovery in such situations has already been addressed within the project.

How can runtime bindings between services and different network types be effectively configured?

This has been addressed by (Murray & Pesch 2004b) in that broad classes of applications can be factored into the decisions made about inter-access network handover. In addition, the increasing assumption of TCP/IP transport makes the choice of wireless access technology less crucial to QoS unaware services. The separation of abstract service specification from concrete protocol grounding as defined for the OWL-S service ontology offers a more general mechanism for addressing this problem, as this language become more mature and widely used across the programme.

How can knowledge be easily shared between individual developers and between software entities to avoid the constraints of slowly developed standards while encourage enough conceptual convergence to avoid a chaotic body of reusable knowledge?

An increasing focus on service and resource meta-data semantics, captured either in XML schema or ontologies, offers a mechanism for such sharing, but specific understanding of suitable guidelines are yet to emerge within the project. The exchange of schema for testbed integration between partners in WP4 may offer some practical experience in these issues.

What level of commonality is possible or useful between knowledge-based representations of services, shared information and behavioural rules?

This is still an open issue, but as the discussion of architectural issues above reveals, solutions would seem to lie in models of individual components that bring together segments of service, resources and policy rules centred on a deployable and reusable smart space element.

D3.3 *What is the underlying metaphor (paradigm) of a smart space that needs to be addressed by engineering managed zones?*

The complexity of Smart Space management is understood within different research domains and with specific view points. It seems to be necessary to look at common characteristics of these complexities in order to fully understand the managed area.

Can we identify a meta model for loosely coupled components that enables interoperability, scalability and portability of these components?

There is no agreement on a common meta-model. Scalability is rarely addressed. Portability is becoming an interesting issue, by means of mechanisms to enable mobile policies and management activities. Interoperability is mainly addressed by the exchange of information supported by ontologies.

To what extent do we need to incorporate semantic information into object models, repositories and formal notations?

This is still an important research question. It should be addressed keeping in mind that semantic information can also be found in the modelling and design tools employed in the process. It is commonly understood that this information are essential for an effective management of Smart Spaces.

What are the novel management functions that are needed to use, operate, control, administer and maintain a smart space and a group of smart spaces?

Management functions have to be portable across domains. This impacts business modelling and makes global (at least inter-domain) naming and addressing of resources necessary.

What services, protocols and formats must be provided by the underlying technical environment to enable managed zones?

The underlying technologies already provide services, protocols and formats. This question has to be partially re-phrased towards how existing services, protocols and formats can be accessed by M-Zones in order to fully exploit network capabilities.

Based on the evaluation of whitepapers from early 2003 and early 2004, both deliverables agree that these discussions raise further issues that would be fruitful to be addressed in the programme's ongoing research activities:

D# Question

- D2.3 Can a useful common meta-model of a smart space component be agreed? What aspects should such a model encompass and what level of intelligence should such components embody?
- Can ad hoc routing principles be applied to knowledge-based routing and distributed context querying?
- Can the range of policy-based management approaches addressed across the project be addressed in a single approach covering user, smart space operator and network service provider requirements?
- Is dynamic service composition sufficient for adaptive application behaviour in smart spaces and is it suitably manageable?
- D3.3 Will policy-based management be the dominant mechanism for managing Smart Spaces?
- What characterises 'adaptive policies', what mechanisms are used to adapt rules and what algorithms are important?
- How is the transformation across different levels of abstraction (ontology, object model, technical environment) organised?

The following sub-sections give a complete list of all whitepapers.

3.1 D1.1 State of the Art Papers

Keara Barrett, Ruaidhrí Power: *State of the Art: Context Management*. May, 2003

Ray Carroll, Sinead Cummings, Fergus O'Reilly, Jason Finnegan: *State of the Art: Middleware in Smart Space Management*. May, 2003

Robert O'Connor: *State of Art Survey: Intra-domain and Inter-domain Management of Smart Space Environments*. May, 2003

Kevin Carey, Kevin Feeney, Dave Lewis: *State of the Art: Policy Techniques for Adaptive Management of Smart Spaces*. May, 2003

Owen Conlan: *State of the Art: Adaptive Hypermedia*. May, 2003

Steffen Higel, Dave Lewis: *State of the Art: Service Composition*. May, 2003

John Paul O'Grady, A. McDonald: *State of the Art: Ad Hoc Networking*. May, 2003

Ken Murray, Dirk Pesch: *State of the Art: Admission Control and Mobility Management in Heterogeneous Wireless Networks*. May, 2003

3.2 D2.1, 3.1, 4.1 Whitepapers

P. Rulikowski: *Ultra Wide Band Communication Literature Review*. June, 2003

Declan O'Sullivan, Dave Lewis: *Semantically Driven Service Interoperability for Pervasive Computing*. June, 2003

Ruaidhrí Power: *Topic Maps for Context Management*. June, 2003

Tony O'Donnell, Steffen Higel, Aoife Brady, Vincent Wade: *Towards a Natural Interface to Adaptive Service Composition*. June, 2003

Alan Davy: *Characteristics of a smart device and smart device operation*. May, 2003

Darach Cawley: *The components of a Smart Space Platform for Smart Service Deployment*. May, 2003

Keara Barrett, Ray Carroll, Sven van der Meer: *Investigating Macro and Micro Mobility in Smart Environments*. May, 2003

Robert O'Connor, Sven van der Meer: *Present and Future Organisational Models for Wirelss Networks*. May, 2003

Sven van der Meer: *Technologies for Engineering Smart Spaces with special focus on integration of middleware and management*. May, 2003

Sven van der Meer: *Middleware and Management Standard Bodies and Standards*. May, 2003

Sven van der Meer: *Middleware and Management Concepts, Characteristics, and Integration*. May, 2003

Owen Conlan, Ruaidhrí Power, Steffen Higel, Declan O'Sullivan, Keara Barrett: *Next Generation Context Aware Adaptive Services*. May, 2003

Kevin Carey, Brian Cullen, Dave Lewis, Vincent Wade: *Assurance Management in Smart Spaces*. May, 2003

Kevin Feeney: *Beyond the role model: Organisational modelling in policy based management system*. May, 2003

Ken Murray, Dirk Pesch: *Policy based Admission Control across heterogeneous wireless networks*. May, 2003

Sinead Cummings, Fergus O'Reilly: *Service Delivery in Wireless Ad Hoc Networks using Jini*. May, 2003

3.3 D2.3, 3.3, 4.3 Whitepapers

Alan Davy: *Task Driven Service Composition for Pervasive Computing Environments*. June, 2004

Mike White: *Access Control in Smart Space Environments*. June, 2004

Ray Carroll: *Information Modelling for a Smart Space Personal Information Management System*. June, 2004

- Samir Ghamri, Sven van der Meer, Robert O'Connor, Yacine Ghamri, Nazim Agoulmine: *Resources Discovery and Management using Policies in Smart Spaces*. June, 2004
- Aoife Brady, Owen Conlan, Vincent Wade: *Dynamic Composition and Personalisation of PDA-based eLearning - Personalised mLearning*. June, 2004
- Karl Quinn, Declan O'Sullivan, Vincent Wade: *Policy driven Composition of Trustworthy Web Services*. June, 2004
- Kevin Carey, Dave Lewis, Vincent Wade: *Automated Policy-Refinement for Managing Composite Services*. June, 2004
- Steffen Higel, Dave Lewis, Vincent Wade: *Dynamic Web-Service Composition: eBusiness Just for You!*. June, 2004
- John Barrett, P. Rulikowski: *Truly Balanced Step Recovery Diode Pulse Generator with Single Power Supply*. June, 2004
- John Paul O'Grady, Dirk Pesch: *Influence of Network Merger on Address Assignment Strategies for Mobile Ad Hoc Networks*. June, 2004
- Ken Murray, Dirk Pesch: *Intelligent Network Access and Inter-System Handover Control in Heterogeneous Wireless Networks for Smart Space Environments*. June, 2004
- Ken Murray, Dirk Pesch: *Policy Based Access Management and Handover Control in Heterogeneous Wireless Networks*. June, 2004
- Martin Klepal, Rajiv Mathur, A. McGibney, Dirk Pesch: *Indoor Channel Model for Link BER Estimation*. June, 2004
- Rajiv Mathur, Martin Klepal, A. McGibney, Dirk Pesch: *Influence of People Shadowing on Bit Error Rate IEEE802.11 2.4GHz Channel*. June, 2004
- Susan Rea, Dirk Pesch: *Multi-metric Routing Decision for Ad Hoc Networks using Fuzzy Logic*. June, 2004
- Susan Rea, Rajiv Mathur, Dirk Pesch: *Aperiodic Cache Exchange for New Network Nodes in Wireless Mobile Ad Hoc Networks*. June, 2004
- Keara Barrett: *The dynamic adaptation of security policies in pervasive environments, with contextual information as the catalyst*. May, 2004
- Ruaidhrí Power, Declan O'Sullivan, Owen Conlan, Dave Lewis, Vincent Wade: *Resolving Queries in a Heterogeneous Context Rich Environment*. May, 2004
- Tony O'Donnell, Dave Lewis, Vincent Wade: *Using Event Aggregation to Provide Autonomic Mixed Initiative Personalized Service Support in UbiComp Environments*. May, 2004

4 Workshops

This section summarises the public workshops organised by the M-Zones programme since it started. Each of the three major events is summarised. The aim in doing these activities was to create a critical mass of publication activity to stimulate debate and feedback from the academic community, and potentially industrial researchers. There is a twin pronged strategy to this approach:

- 1) to establish an International Workshop MUCS (Management of Ubiquitous Communications and Services) in Ireland hosted by the M-Zones partner institutions;

- 2) to organise thematic workshops in existing conferences with established audiences for the key messages from M-Zones

To date both strategies have produced results. Two iterations of the MUCS workshop have run: MUCS 2003 (in Waterford), MUCS 2004 (in Cork), and a third is planned MUCS 2005 (in Cork). Here the aim is to establish this international workshop as an IEEE Computer Society/ACM sponsored conference by establishing a strong track record. One workshop has been organised in a wider interest conference at eChallenges 2004 (in Vienna). This conference has a large attendance with primary, though not exclusive, focus on EU-funded IST research projects.

4.1 MUCS 2003

The First International Workshop on Management of Ubiquitous Communications and Services (MUCS 2003) was organised by WIT and strongly supported by CIT and TCD. It was held on the WIT campus on December 11th 2003.

4.1.1 Focus

The current trends in converged networks and pervasive computing show an increasing interest in operation and control of smart space infrastructures. Bringing together adaptable services, ubiquitous management and environments rich on services and devices leads to the concept of a managed zone covering smart space services as well as smart space management. The scientific challenge here is to develop open information and communications management technology that supports dynamic, integrated management of participants, information appliances and the actual smart space infrastructure.

4.1.2 Content

The 1st Open M-Zones Workshop presents conceptual solutions for an open smart space management by means of three research themes.

Adaptive Services investigates techniques and models that support autonomous adaptation of systems to match user needs to available service capabilities and the current context. This theme focuses on aspects of adaptivity that are driven by implicit rather than explicit direction from the user and which therefore need to rely heavily on context information and learnt user patterns.

Seamless Engineering of Open Smart Spaces concentrates on the business to network translation, e.g. adapting a user needs and smart services to dynamically changing physical environments and vice versa. Main objective is to offer solutions for adaptive systems that are enabled to respond effectively to various user locations, service usage needs, QoS capabilities, and connection and device requirements.

Managing Dynamic Environments focuses on network element level management and functional aspects to create a dynamic and adaptive network environment for users, user applications and devices in smart spaces. This theme is driven by context-ware computing and networking technologies, e.g. admission control and roaming in heterogeneous wireless

networks, management issues in ad-hoc networks, and sensor network applications for smart spaces.

The presentations given with this workshop show results from the HEA research programme M-Zones, which was started in August 2002. Prior to this open workshop, the M-Zones programme has already hold one internal workshop and has organised a workshop on Adaptive Systems for Ubiquitous Computing Environments at the ACM International Symposium on Information and Communication Technologies, September 2003, Dublin.

4.1.3 Organisation

Venue: Waterford Institute of Technology, Auditorium

Dates: December 11th, 2003, Time: 09:00 – 16:30

The workshop itself is organised in four sessions. Starting with a welcome note given by the Director of WIT, Prof. Kieran R. Byrne, each of the research themes will be presented in a dedicated session. The workshop will finish with a panel session, which will provide the audience with a forum for an open discussion of the workshop presentations as well as other interests in the given research topics.

4.1.4 Programme

08:30 – 09:00	Registration
09:00 – 09:15	Welcome and Keynote, Director of WIT

09:15 – 10:45	Session A – Adapting to a User's Needs
	Context-aware, Ontology-based, Managed Person-centric Adaptive Services. <i>Vinny Wade</i>
	Person centric Service Adaptation, <i>Dave Lewis</i>
	Bridging heterogeneous, autonomous, dynamic knowledge at runtime. <i>Declan O'Sullivan</i>
	Policy Based Management for Internet Communities. <i>Dave Lewis</i>

11:00 – 12:30	Session B – Seamless Engineering of Smart Spaces
	Introduction. <i>Sven van der Meer</i>
	Design Principles for Smart Space Management. <i>Sven van der Meer</i>
	Ubiquitous Smart Space Management. <i>Sven van der Meer</i>
	Infrastructure Requirements for Smart Spaces and Managed Zones. <i>Mícheál Ó Foghlú</i>

13:30 – 15:00	Session C – Managing Dynamic Environments
	Network Access and Handover Control in Heterogeneous Wireless Networks for Smart Space Environments. <i>Dirk Pesch</i>
	Sensor Network Infrastructure for Smart Spaces. <i>John Barret</i>
	Management aspects of dynamic networks. <i>Fergus O'Reilly</i>

15:30-16:30	Session D, Panel
	Smart Space Management – can we close the gap?

4.1.5 Summary Statistics

Attendees: 30

Countries: Ireland, UK, Germany

Presentations: 11 presentations

Proceedings: Published on-line on M-Zones website

http://www.m-zones.org/deliverables/d234_2/d234_2.php4

4.2 MUCS 2004

The Second International Workshop on Management of Ubiquitous Communications and Services (MUCS 2004) is currently organised by TCD and strongly supported by WIT and CIT. It will be held on December 13th and 14th on the Trinity campus.

4.2.1 Call for Papers

Ubiquitous Communications, as evidenced in pervasive computing and smart space applications present significant management challenges for successful delivery of highly adaptive services across heterogeneous networks, middleware, applications and devices. Today's management systems are unable to cope with the complexity, heterogeneity and automation required by the pervasive computing vision. New paradigms, models and technology need to be developed to allow computer systems to manage themselves in accordance with high-level guidance from humans. This workshop seeks to explore the theoretic, technological and organizational challenges in managing ubiquitous communications and application services.

The workshop provides a single-track scientific programme containing a blend of keynote presentations from leaders in the research of communications and services management systems, peer-reviewed papers and a small selection of invited presentations. The goal of the workshop is to investigate the state of the art in managing such communications systems.

4.2.2 Topics of Interest

Submissions are invited for original and previously unpublished research in all aspects of management techniques in ubiquitous communications, including:

- Context Aware Self Management and Self Configuration Management
- Policy Based Management for Ubicomp environments
- Autonomic Communications and Systems Management
- Integrated Management of Wireless and Fixed Networks
- Management of Smart Space Devices and Applications (Smart Home/Office etc)
- Adaptive Service and Network Management
- Dynamic Composition of Management Services for Ubicomp environments

- Ambient Intelligence for Management
- Security, Trust and Privacy in Ubiquitous Communications
- Management and Control of mobile ad-hoc and sensor networks
- Content Oriented Network & Service Management
- Performance Management in Wireless Computing and Communications
- Distributed Self Management & Collective Collaboration
- Context Identification, Retrieval and Management
- Service and Network Management for Personalisation Optimisation
- Collaborative Management of Systems
- Provisioning and Maintenance of Quality of Service in UbiComp environments
- Knowledge Representation techniques and Ontologies for Distributed Management Services

4.2.3 Invited Keynote Speakers

- Dr John Strassner, TeleManagement Forum, USA
- Prof Morris Sloman, Imperial College London, UK
- Prof Lajos Hanzo, Southampton University, UK

4.2.4 Organisation

Workshop Chair: Vincent Wade

Organising Committee: Dirk Pesch, Sven van der Meer and Vincent Wade

Scientific Programme Committee:

4.2.5 Summary Statistics

Attendees: 80

Countries: Ireland, UK, France, Denmark, Switzerland, Germany, USA

Presentations: 12, 3 keynotes, plus posters

Proceedings: Published on-line on M-Zones website

http://www.m-zones.org/deliverables/d234_4/d234_4.php4

4.3 Management of Smart Spaces (eChallenges 2004)

WIT (Mícheál Ó Foghlú) organised a workshop on “Management of Smart Spaces” for the eChallenges conference 2004 in Vienna. The aim was to present a summary of theoretical and

practical work done in this area of three domains (the home, the workplace and an educational environment) and at two levels (the smart space management level and the enabling infrastructure level) to a mixed audience of industrial researchers and academic researchers interested in the area of mobile services. The following information documents the workshop structure and context.

4.3.1 Abstract

This workshop aims to address the issues surrounding the development of managed interoperable smart spaces in a number of different domains. At its simplest, smart spaces are any wireless information system in which some form of context sensitive behaviour is provided.

The workshop is designed to open up the findings of the Irish HEA-funded research project M-Zones (<http://www.m-zones.org>), involving three Irish research institutions, to international peer-review, and to demonstrate the linkages to potential future areas of work in managing wireless smart space environments in the workplace, in a learning environment, and in the home environment.

The discussion will also draw on the other research projects in which the participants have been involved including the FP5 research projects Opium and AlbatrOSS, and others.

The core theme of the workshop is that, whilst much work is being carried out on individual smart spaces, little thought has been given to co-ordinated approaches that would allow managed interactions between smart spaces. The debate is now about how standardised mechanisms can be developed to allow this new market to be opened up for innovative services.

4.3.2 Objectives

The main aim of the workshop is to create a forum for the exchange of ideas between the EU Commission, industry, and the research community around the core issue of standardisation of the emerging wireless services arena. We believe it is the first time that the core issue of how these services will be managed and interoperate has been addressed. In the past most discussion has been around the benefits of one particular proprietary system or another.

The main benefit for the research groups presenting is to gain a deeper understanding of the constraints imposed by real world deployments of these largely theoretical or laboratory-based systems.

The main benefit for industry is to see how the emerging theories can help build interoperable and manageable systems in the future.

An important issue that many heavily managed systems to date have been conceived, developed and deployed within a pure telecommunications environment. In contrast, the open nature of the public IP-based network has led to a diversity of relatively unmanaged systems on the Internet.

The telecommunication industry's desire to push 2.5G and 3G services, and the wide spread popularity of alternative (some would call disruptive) wireless technologies such as WiFi and Bluetooth, are helping create many possibilities for the future of wireless services. Therefore it is important that these types of debates occur in an informed environment.

4.3.3 Programme

The core structure is of 4 * 15 min presentations with discussion after each and discussion at the end. The primary purpose is to stimulate and encourage this discussion, rather than describe how good our current and/or previous projects have been. The core focus is future directions rather than existing systems.

1) Mícheál Ó Foghlú (TSSG, WIT): Infrastructure Issues for Smart Spaces

This talk will summarize the themes of the workshop, and address the underlying requirements for the enabling infrastructure for smart space management and interoperability. This will focus on what is achievable today by using results from various open source projects, and initiatives and by predicting the potential future adoption of technologies (e.g. IPv6).

2) David Lewis (Trinity College Dublin): Management of Smart Spaces - a Telecommunications Perspective

This will be a theoretical look at how concepts from telecommunications management can be adapted to the use of smart space management. It will draw on Dave's experiences in TCD, and previously at UCL, London.

3) Sven van der Meer (TSSG, WIT): Management of Smart Spaces - a Computing Perspective

This talk will look at the same domain of smart space management, but from a computer networking perspective. This talk will draw on Sven's experiences in the TSSG, WIT and on his prior experience in FHG Fokus, Berlin.

4) Dirk Pesch (Cork Institute of Technology): Network resource management for wireless smart spaces

For smart spaces to work, some form of wireless data network is required. This talk will address the issues and constraints imposed by the various types of wireless network, and on the primary issues of network resource management.

5) Open Discussion (Chair: Mícheál Ó Foghlú, TSSG, WIT)

4.3.4 Summary Statistics

Attendees: 3,000
Countries: Wide range of EU and other countries
Presentations: 4 at workshop; Over 200 at conference
Proceedings: Published by IOS Press

eAdoption and the Knowledge Economy: Issues, Applications, Case Studies
Paul Cunningham and Miriam Cunningham (Eds)
Volume 1, pp. 28-34
IOS Press: Amsterdam; ISBN: 1-58603-470-7

5 Individual Publications (Conference and Journal)

The following sub-sections provide a complete list of all peer-reviewed papers. The papers are given for each year from 2002-2004.

5.1 2002 Conference and Journal Publications

Dave Lewis, Vincent Wade, Brian Cullen: *Towards the Technology Neutral Modelling of Management Components*. Journal of Network and Systems Management, vol 11, no. 1, March, 2002

Susan Rea, Dirk Pesch: *Source Routing Based on Destination Frequency Analysis for Wireless Mobile Ad-Hoc Networks*. Proceedings of 2nd annual Conference on Information Technology and Telecommunications, IT&T, Waterford, Ireland, October 30-31, 2002

Declan O'Sullivan, Vincent Wade, Owen Conlan: *Enabling Smart Space Service Mobility Negotiation by Ordinary Users*. Proceedings of 2nd annual Conference on Information Technology and Telecommunication, IT&T, Waterford, Ireland, October 30-31, 2002

S. Carey, Fergus O'Reilly: *Heterogeneous Tools for Heterogeneous Network Management using WBEM*. Proceedings of 2nd annual Conference on Information Technology and Telecommunication, IT&T, Waterford, Ireland, October 30-31, 2002

Declan O'Sullivan, Sinead Cummings: *Enabling Roaming across smart spaces using Java and Semantic Web Technologies*. Eurescom Summit 2002: Powerful Networks for Profitable Services, Heidelberg, Germany, October 21-24, 2002

5.2 2003 Conference and Journal Publications

Sven van der Meer, Brendan Jennings, Keara Barrett, Ray Carroll: *Design Principles for Smart Space Management*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Sven van der Meer, Robert O'Connor, Alan Davy: *Ubiquitous Smart Space Management*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Declan O'Sullivan, Ruaidhrí Power: *Bridging heterogeneous, autonomous, dynamic knowledge at runtime*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Mícheál O'Fughlú: *Infrastructure Requirements for Smart Spaces and Managed Zones*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Dave Lewis, Vincent Wade: *Policy Based Management for Internet Communities*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Sinead Cummings, Paul O'Grady, Fergus O'Reilly: *Managing Wireless Ad-hoc Networks, IP Addressing and Service Delivery*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Dave Lewis, Tony O'Donnell, Kevin Feeney, Aoife Brady: *Person Centric Service Adaptation*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Ken Murray, Rajiv Mathur, Dirk Pesch: *Network Access and Handover Control in Heterogeneous Wireless Networks for Smart Space Environments*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

P. Rulikowski, R. Martinez, John Barrett: *Sensor Network Hardware Infrastructure for Smart Spaces*. First International Workshop on Management of Ubiquitous Communications and Services, MUCS, Waterford, Ireland, December 11, 2003

Ken Carey, Fergus O'Reilly: *Alarm Monitoring for Heterogeneous Telecom Networks*. The 15th International Conference on Wireless Communications, Wireless, Calgary, Alberta, Canada, July 12-14, 2003

Gráinne Foley, Fergus O'Reilly: *Wireless Device Provisioning and Reconfiguration-Advanced Interoperability*. The 15th International Conference on Wireless Communications, Wireless, Calgary, Alberta, Canada, July 12-14, 2003

Ken Murray, Rajiv Mathur, Dirk Pesch: *Adaptive Policy Based Management in Heterogeneous Wireless Networks*. 6th International Symposium on Wireless Personal Multimedia Communications, WPMC, Yokosuka, Kanagawa, Japan, October 19-22, 2003

Owen Conlan, Dave Lewis, Steffen Higel, Declan O'Sullivan, Vincent Wade: *Applying Adaptive Hypermedia Techniques to Semantic Web Service Composition*. 12th International World Wide Web Conference, WWW, Budapest, Hungary, May 20-24, 2003

Rajiv Mathur, Dirk Pesch, James Irvine: *Dimensioning 3G Networks*. 3rd annual Conference on Information Technology and Telecommunications, IT&T, Letterkenny, Ireland, October 22-23, 2003

Ken Murray, Rajiv Mathur, Dirk Pesch: *Policy Based Mobility Management in Heterogeneous Wireless Networks for Smart Space Environment*. 3rd annual Conference on Information Technology and Telecommunications, IT&T, Letterkenny, Ireland, October 22-23, 2003

X. Zheng, Dirk Pesch: *Policy Based Management of Wireless Ad-Hoc Networks*. 3rd annual Conference on Information Technology and Telecommunications, IT&T, Letterkenny, Ireland, October 22-23, 2003

Keara Barrett, Ray Carroll, Sven van der Meer: *Investigating the Applicability of Mobile IP and Cellular IP for Roaming in Smart Environments*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Sinead Cummings, Fergus O'Reilly: *Service Delivery in Wireless Ad Hoc Networks using Jini*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Donna Griffin: *Delivering IP Based Wireless Multimedia Messaging*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Jessy Kielthy, Richard Frisby, Mícheál O'Fughlú: *An initial investigation into QoS provisioning in a DiffServ Network*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Jimmy McGibney, Sean Hearne: *An Approach to Rules based Fraud Management in Emerging Converged Networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Ken Murray: *Policy based Admission Control across heterogeneous wireless networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Robert O'Connor, Sven van der Meer: *Present and Future Organisational Models For Wireless Networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

John Paul O'Grady: *Dynamic IP Address Assignment in Ad Hoc Networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Eoin O'Regan: *A SIP based Push-to-Talk Service for GPRS/UMTS Networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Susan Rea: *Dynamic Route Cache Restructuring as an approach to Route Cache Management*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

Raja Verma, Hitesh Tewara, Donal O'Mahony: *Wanderer: Secure Group Formation and Communication in Ad Hoc Networks*. Telecommunications Systems Research Symposium, ITSRS, Dublin, Ireland, May 6, 2003

S. Zvanovec, P. Pechac, Dirk Pesch: *Wireless LAN Networks Design: Site Survey or Propagation Modeling?*. Radioengineering, Vol. 12, No.4 December, 2003

Dirk Pesch, John Barrett, Fergus O'Reilly: *Adaptive Wireless Systems Research at Cork Institute of technology*. The Irish Scientist 2003 Year Book, No.11, November, 2003

Declan O'Sullivan, Dave Lewis: *Semantically Driven Service Interoperability for Pervasive Computing*. 3rd International Workshop on Data Engineering for Wireless and Mobile Access, MobiDE, San Diego, CA, USA, September 19, 2003

Ken Carey, Fergus O'Reilly: *Alarm Management and its Evolution to 3G*. Fourth International Conference on 3G Mobile Communication Technologies, 3G, London, UK, June 25-27, 2003

Rajiv Mathur, Dirk Pesch, James Irvine: *On Capacity, Dimensioning, and Pricing of Future Cellular Networks*. 8th International Conference on Cellular and Intelligent Communications, CIC, Seoul, Korea, October 28-31, 2003

Steffen Higel, Tony O'Donnell, Dave Lewis, Vincent Wade: *Towards an Intuitive Interface for Tailored Service Compositions*. 4th International Conference on Distributed Applications and Interoperable Systems, DAIS, Paris, France, November 17-21, 2003

D. Dagger, Vincent Wade, Owen Conlan: *Towards "anytime, anywhere" Learning: The Role and Realization of Dynamic Terminal Personalization in Adaptive eLearning*. World Conference on Educational Multimedia, Hypermedia & Telecommunications, ED-Media, Hawaii, USA, June 25-28, 2003

L. Clarke, Vincent Wade, Owen Conlan, D. Dagger: *Personalisation for Adult eLearning - an AHS Approach*. World Conference on Educational Multimedia, Hypermedia & Telecommunications, ED-Media, Hawaii, USA, June 25-28, 2003

D. Dagger, Owen Conlan, Vincent Wade: *An Architecture for Candidacy in Adaptive eLearning Systems to Facilitate the Reuse of Learning Resources*. World Conference on E-Learning in Corporate, Government, Healthcare & Higher Education, E-Learn, Phoenix, AZ, USA, November 7-11, 2003

- Owen Conlan, P. Funk: *Case-Based Reasoning to Improve Adaptability of Intelligent Tutoring Systems*. 14th Conference on Hypertext and Hypermedia, Hypertext'03, Nottingham, UK, August 26-30, 2003
- X. Zheng, P. Pulli, Dirk Pesch: *Towards Dynamic Modelling of Mobile Scenarios*. International Conference on Communication Technology, ICCT, Beijing, China, April 9-11, 2003
- Rajiv Mathur: *An Integrated Framework for Managing Future Wireless Networks*. International IT Events, Toronto, IITE, Canada, October, 2003
- Gráinne Foley, Fergus O'Reilly: *Software Distribution for Wireless Devices, A Reconfigurable Approach*. IFIP/IEEE Eighth International Symposium on Integrated Network Management, IM, Colorado Springs, USA, March 24-28, 2003
- Owen Conlan, Ruaidhrí Power, Steffen Higel, Keara Barrett: *Next Generation Context Aware Adaptive Services*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Stephen Greene, Jason Finnegan, Sven van der Meer: *Usability of Mobile Devices and intelligently adapting to a User's needs*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Steffen Higel, Tony O'Donnell, Vincent Wade: *Towards a Natural Interface to Adaptive Service Composition*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Dave Lewis: *Workshop on Adaptive Systems for Ubiquitous Computing - Chair's Introduction*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Ken Murray, Dirk Pesch, Rajiv Mathur: *Intelligent Access and Mobility Management in Heterogeneous Wireless Networks using Policy*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Robert O'Connor, Sven van der Meer: *Present and Future Organisational Models For Wireless Networks*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- John Paul O'Grady, Susan Rea, Sinead Cummings, Dirk Pesch, Rajiv Mathur: *Ad hoc Network Management - An Overview*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- John Paul O'Grady, Susan Rea, Sinead Cummings, Dirk Pesch, Rajiv Mathur: *Dynamic Configuration Management for MANETs - An Overview*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003
- Ruaidhrí Power: *Topic Maps for Context Management*. International Symposium on Information and Communication Technologies, ISICT, Dublin, Ireland, September 24-26, 2003

5.3 2004 Conference and Journal Publications

Dave Lewis, Owen Conlan, Declan O'Sullivan, Vincent Wade: *Managing Adaptive Pervasive Computing using Knowledge-based Service Integration and Rule-based Behaviour*. Network Operations & Management Symposium, NOMS, Seoul, South Korea, April 19-23, 2004

Dave Lewis, Kevin Feeney, Vincent Wade: *Policy Based Management for Internet Communities*. IEEE 5th International Workshop on Policies for Distributed Systems and Networks, Policy, IBM, New York, USA, June 8-9, 2004

John Barrett, P. Rulikowski: *Truly Balanced Step Recovery Diode Pulse Generator with Single Power Supply*. IEEE Radio and Wireless Conference, RAWON, Atlanta, GA, USA, September 19-22, 2004

Boris Rousseau, Parish Brown, Paul Malone, Mícheál O'Foghlú: *User Profiling for Content Personalisation in Information Retrieval*. 19th ACM Symposium on Applied Computing, SAC, Nicosia, Cyprus, March, 2004

Martin Klepal, Rajiv Mathur, A. McGibney, Dirk Pesch: *Influence of People Shadowing on Optimal Deployment of WLAN Access Points*. 60th IEEE Vehicular Technology Conference 2004-Fall, VTC2004-Fall, Los Angeles, CA, USA, September, 2004

Ken Murray, Dirk Pesch: *Policy based Access Management and Handover Control in Heterogeneous Wireless Access Networks*. 60th IEEE Vehicular Technology Conference 2004-Fall, VTC2004-Fall, Los Angeles, CA, USA, September, 2004

John Paul O'Grady, A. McDonald, Dirk Pesch: *Network Merger and its Influence on Address Assignment Strategies for Mobile Ad Hoc Networks*. 60th IEEE Vehicular Technology Conference 2004-Fall, VTC2004-Fall, Los Angeles, CA, USA, September, 2004

P. Pechacl, Martin Klepal, D. Edwards: *Modeling and Optimization of Heterogeneous Wireless LAN*. 60th IEEE Vehicular Technology Conference 2004-Fall, VTC2004-Fall, Los Angeles, CA, USA, September, 2004

Susan Rea, Dirk Pesch: *A periodic Cache Exchange for New Network Nodes in Wireless Mobile Ad-Hoc Networks*. 60th IEEE Vehicular Technology Conference 2004-Fall, VTC2004-Fall, Los Angeles, CA, USA, September, 2004

Dave Lewis, Kevin Feeney, T. Tiropanis, S. Courtenage: *An Active, Ontology-driven Network Service for Internet Collaboration*. The 1st IFIP TC6 WG6.6 International Workshop on Autonomic Communication, WAC, Berlin, Germany, October 18-19, 2004

Sinead Cummings, Fergus O'Reilly: *Ad hoc Service Delivery*. The 16th International Conference on Wireless Communications, Wireless, Calgary, Alberta, Canada, July 7-9, 2004

Donna Griffin, Fergus O'Reilly: *A Multimedia Delivery Systems for UMTS*. The 16th International Conference on Wireless Communications, Wireless, Calgary, Alberta, Canada, July 7-9, 2004

Martin Klepal, Rajiv Mathur, A. McGibney: *Indoor Channel Model for link BER estimation*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

A. Martinez, John Barrett: *RF System-In-Package (SiP): Implementation of a Low-Cost "Intelligent" RF Transceiver*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

Ken Murray, Dirk Pesch: *Mobility Modeling using Attraction Points for Cellular Network Environments*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

Ruaidhrí Power, Declan O'Sullivan, Owen Conlan, Dave Lewis, Vincent Wade: *Resolving Queries in a Heterogeneous Context Rich Environment*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

Karl Quinn, Declan O'Sullivan, Dave Lewis, Vincent Wade: *Policy Driven Composition of Trustworthy Web Services*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

C. Shen, Dirk Pesch, James Irvine: *Distributed Dynamic Channel Allocation Algorithms with Fuzzy Model Selection*. 4th annual Conference on Information Technology and Telecommunications, IT&T, Limerick, Ireland, October 20-21, 2004

S. Karlich, T. Zahariadis, Brendan Jennings, V. Kollias, Thomas Magedanz: *A Self-Adaptive Service Provisioning Framework for 3G+/4G Mobile Applications*. IEEE Wireless Communications Magazine, October, 2004

Steffen Higel, Dave Lewis, Vincent Wade: *Dynamic Web Service Composition - eServices Just for You!*. Annual Conference of the Irish Academy of Management, Dublin, Ireland, September 2-3, 2004

Keara Barrett, Ray Carroll, Venet Osmani, Sven van der Meer: *User-Centric Management of Ubiquitous Environments - Challenges & Initial Solutions*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Rob Brennan, Karl Quinn, Declan O'Sullivan, Dave Lewis: *On the Application of Paired Comparison to Trust*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Susan Rea, Dirk Pesch: *Fuzzy Logic based Multi-Metric Route Management for Ad-hoc Networks using Realistic Mobility Model*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Kevin Carey, Dave Lewis, Steffen Higel, Vincent Wade: *Adaptive Composite Service Plans for Ubiquitous Computing*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Kevin Feeney, Dave Lewis: *Community Based Policy Management for Smart Spaces*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Dave Lewis, Kevin Feeney, Kevin Carey, T. Tiropanis, S. Courtenage: *Semantic-based Policy Engineering for Autonomic Systems*. Second International Workshop on Management of Ubiquitous Communications and Services, MUCS, Dublin, Ireland, December 13-14, 2004

Dave Lewis, Tony O'Donnell, Kevin Feeney, Aoife Brady, Vincent Wade: *Managing User-centric Adaptive Services for Pervasive Computing*. International Conference on Autonomic Computing, ICAC, New York, USA, May 17-18, 2004

Martin Klepal, P. Pechac: *Large Dynamic Range Prediction of AOA, AOD and PDP for MIMO Systems*. 12th International Conference on Antennas & Propagation, ICAP, Exeter, UK, March, 2004

Boris Rousseau, Parish Brown, Paul Malone, Mícheál O'Foghlú: *Personalised resource Discovery Searching Over Multiple repositories: Using user and information provider profiling*. 6th International Conference on Enterprise Information Systems, ICEIS, Porto, Portugal, April, 2004

John Ronan, Steven Davy, Paul Malone, Mícheál O'Foghlú: *Performance implications of IPsec deployment*. Inter-domain Performance and Simulation Workshop, Intermon, Budapest, Hungary, March, 2004

Chamil Kulatunga, Jessy Kielthy, Paul Malone, Mícheál O'Foghlú: *Implementation of a simple Bandwidth Broker for DiffServ networks*. Inter-domain Performance and Simulation Workshop, Intermon, Budapest, Hungary, March, 2004

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6 Conclusion

This report, D5.1, is the first in a series of evaluation reports on the M-Zones research programme. The main focus of this report is the articulation of the publication strategy, and the use of publications as the key quality metric for the programme. The secondary purpose of this report is to outline the intended focus of subsequent reports in this series D5.2 scenario-based demonstration evaluation strategy, D5.3 final evaluation report utilising demonstrator methodology and publication metrics.

The M-Zones programme has produced a large volume of publications targeting a range of quality metrics: internally reviewed white papers, national conferences, international conferences and journals. These publications reflect not only individual excellent in each of the partner institutes, but also strategic collaborative research outputs.

One key metric for the programme going forward is to increase the number of journal papers, and to track the citation rates on public citation indexes.

The next report in the series will address the issue of the quality of the outputs of the programme in terms of its scenario-based integrated demonstrations.