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AN.01	Bertrand MATHIEU [bertrand2.mathieu@orange-ftgroup.com]	Bertrand Mathieu, Meng Song, Alex Galis, Lawrence Cheng, Kerry Jean, Roel Ocamo, Zhaohong Lai, Marcus Brunner, Martin Stiemerling, Marco Cassini, Markus Kampmann
	Title	Autonomic Management of Context-Aware Ambient Overlay Networks
	Abstract	Ambient Networks (ANs) introduce a new architecture for fixed and mobile networks. The environment is dynamically changing, heterogeneous since they consist of potentially large numbers of independent, various mobile nodes and with spontaneous topologies. ANs are also flexible i.e. they can compose and decompose dynamically and automatically, for supporting the deployment of cross-domain (new) services. The (de)composition of ANs and all their related functionalities (e.g. mobility, security…) are under the responsibility of the Ambient Control Space (ACS). The AN architecture must be sophisticatedly designed to support such high level of dynamicity, heterogeneity and flexibility. For delivering services, adapted to the dynamically changing user and network context, service specific overlay networks in ANs are created on-demand according to specific service requirements. This paper presents a autonmic approach to create, configure, adapt, contextualise, and finally teardown the context-aware overlay networks.

ID	Responsible	Authors
AN.02	Francesco Meago (francesco.meago@nsn.com)	Francesco Meago, Simona Cavalli, Matteo Coloberti
	Title	Resource Management Methods for Multi-Access Networks: Emulation Results for GSM
	Abstract	The Ambient Networks project aims at designing a future networking environment where today's networks including cellular, wireless and fixed networks are seamlessly and efficiently integrated offering a richer and smarter networking experience to applications and users. Among the envisaged characteristics we mention dynamic composition and establishment of inter-network agreements, multi-access, multi-operator and multi-hop operations, mobility and security support. Efficient resource management methods need here to deal with the different characteristics of the heterogeneous access technologies. In particular the access resources of each technology need to be abstracted up to a level of operation for resource management, this level being as much as possible technology independent. The work involves not only the definition of suitable resource abstractions, but also the definition of related algorithms for the respective abstraction layers and access selection modules. This paper presents two opposite methods for resource management that can theoretically be applicable to multi-access environments. These methods are then contextualised on GSM specific access resources through the definition of related algorithms. Respective performance figures are then evaluated and compared the through emulation.

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AN.03	Nadeem Akhtar (N.Akhtar@surrey.ac.uk)	Nadeem Akhtar, Cornelia Kappler, Peter Schefzcik, Laurensius Tionardi, Di Zhou
	Title	Network Composition: A Framework for Dynamic Interworking between Networks
	Abstract	Scenarios for communication networks of the future envisage a multitude of networks in the core, access as well as user segments, connected via a number of heterogeneous wireline and wireless technologies. Furthermore, the traditional divide between service providers and consumers will disappear with the emergence of new business models where networks can assume multiple roles simultaneously. The Ambient Networks project is developing solutions and frameworks to support such scenarios by applying a concept called Network Composition which is a fundamental aspect of Ambient Network (AN) architecture. Composition can be defined as a framework for dynamic and automatic cooperation between networks. The term cooperation is used here in a broad sense to refer to all sorts of interactions between networks to achieve specific goals. Examples include interworking between a user AN and an access AN to provide network connectivity to the former, sharing of radio resources between two access ANs for load balancing, delegation of AAA functions by a "small" WLAN provider to a "large" operator etc. In this paper, we discuss different aspects of Composition framework.

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AN.04	Markus Kampmann (markus.kampmann@ericsson.com)	M. Kampmann, K. Balos, M. Cano, M. Stiemerling, K. Jean, Z. Lai, S. Bleiholder, A. Tariq
	Title	ASI - Ambient Service Interface
	Abstract	Within the Ambient Networks European research project three reference points have been defined that determine the interactions and services an Ambient Network provides and fully describe it from an external perspective. In this paper, one of these reference points, the Ambient Service Interface (ASI), is described in detail. The ASI is used for connecting external services to the Ambient Control Space (ACS) of an Ambient Network and provides uniform access to Ambient Networks functionality from upper layers. After introducing the ASI main concepts, the Ambient Networks service provisioning role model including the ASI is presented. Different ASI use cases are described and the integration with IMS is discussed. Examples of ASI primitives are given and a proposal for the realization of the ASI framework using web services is given. Finally, the usage and implementation of the ASI in an IPTV usage scenario is presented.

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AN.05	Tang, Haitao (NSN, FI/Helsinki, haitao.tang@nsn.com)	Haitao Tang (NSN), Petteri Pöyhönen (NSN), Ove Strandberg (NSN), Kostas Pentikousis (VTT), Ramon Aguero (UC), Joachim Sachs (Ericsson), Meago Francesco (NSN)
	Title	Paging Issues and Methods for Multiaccess
	Abstract	Battery-driven devices equipped with more than one access technology for accessing communication networks probably have become the trend for the future wireless devices because of their improved flexibility, availability, and accessibility. Ideally, it would be perfect if a "battery-driven" multiaccess device could have all its radio accesses actively associated to the surrounding networks all the time. However, it is usually difficult to reach the perfect situation due to such as the limiting economic factors and the limitation of battery lifetime. In this work, we focus on the issues and solutions for the battery lifetime limitation. As we know, radio access technologies meant to be used with mobile hand-held devices are usually designed to support certain built-in power saving capabilities. Some of them provide more effective power saving schemes than others. The problem becomes even more interesting since the power saving solution for a multiaccess device needs to work with the holistic view for various radio access technologies in the multiaccess device, where some of them have own power saving functions while others do not. In this work, we call this power-saving enabling approach as paging, which also includes the procedures and messaging needed to realize the locating and waking-up procedures. This work is thus to investigate those multiaccess paging methods. It studies the registration-based paging methods where the multiaccess networks need to know the capacity and status information of the multiaccess devices to be paged. It also studies the non-registration paging methods where the multiaccess networks need not to know the capacity and status information of the multiaccess devices to be paged. It also makes numerical analysis on the different degrees of battery lifetime saved under different communication usages, network and device settings, and paging methods.

ID	Responsible	Authors
AN.06	Meng SONG (meng.song@orange-ftgroup.com)	Meng SONG, France Telecom R&D Bertrand MATHIEU, France Telecom R&D
	Title	QoS-aware service specific overlay QSON
	Abstract	The concept of SATO (Service-aware Adaptive Transport overlays) is proposed within a European project (Ambient networks). In the previous vision, the quality of service (QoS) consideration is concerned under controlled by a QoS-routing mechanism and it requires an accurate and effective information services support (relay on sensors). However, such distribution and heterogonous aspects of ambient network bring some challenge to maintain and disseminate such distributed QoS status amount SATO, especially, it lacks the scalability and the performance. In this paper, we propose a distributed membership service, which manages membership information in a QoS aware fashion for SATO. That means, by integrating the QoS feature with each service components, SATO Ports and SATO links, the process of building up SATO allows SATO management to locate the good neighbor according to their quality characteristics. We introduce multiple logically overlay networks which hosting the service with similar quality characteristics and control such QoS-aware overlay network automatically. So, in case of the occurring degradation of QoS or departure of an overlay node in a SATO, the worse node can be quickly replaced by locating a new neighbor within such QoS-aware service cluster. Such process has been done by a P2P based service location mechanism, and it is proved to be scalable and good performance.

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AN.07	Petteri Pöyhönen (petteri.poyhonen@nsn.com)	Petteri Pöyhönen, Janne Tuononen, Haitao Tang, Ove Strandberg
	Title	Study of Handover Strategies for Multi-Operator and Multi-Service Environment
	Abstract	Future wireless networking environment is going to have increased diversity in deployed radio access technologies and similar phenomenon can be foreseen happen for mobile services and related business environment. The new emerging radio technologies would range from short range proximity technologies to wide area coverage ones. This set new challenges for network architectures in order to provide means based on which users can easily and efficiently exploit their mobile devices' multi-access capacities. The access evaluation and selection as done in today's cellular networks are based on rudiment and static pre-defined policies and rules. While they are working solution in the current networking environment which is fairly homogeneous, this would not last long and they would not be feasible solution for the heterogeneous networking environment in the future. We thus study new distributed handover strategies (called as the terminal centric and the network centric strategy) in order to perform the access selection according to the richer set of criteria ranging from end user's preferences to network/service provider capabilities. These strategies would result in more optimal access selection compared to the current methods and correspondingly provide benefits for end users, network and service providers such as enhanced end user experience and more efficient resource utilization. The initial simulation results of the analysis of these new handover strategies used in multi-service and multi-operator environment indicate that the new strategies provide improvements in all measured areas; network and service utilization rates, uptime of mobile terminals and other various connectivity statistics.

ID	Responsible	Authors
AN.08	Di Zhou (di.zhou@siemens.com)	Di Zhou and Cornelia Kappler
	Title	Distributed Event-signaling in Ambient Networks Based on IP-multicast
	Abstract	"Event signaling" (or "event notification") is a widely used approach to enable cooperation and synchronization among relevant control functions in various communication networks, where a control function, i.e. the event-publisher, detects an event and signals/notifies all other concerned control functions, i.e. the event-subscribers, about that event by sending them a dedicated common message containing all related event-information. Currently, event signaling/notification techniques are based on centralized approaches and rely on the static existence and the flawless function of central notification service entities. The more and more dynamic and flexible properties of various self-contained autonomous networks, like Ambient Networks, make it difficult to always ensure the prerequisites of applying such centralized event signaling approaches and demand more flexible distributed approaches without requiring any significant supports of any central service entities. This document proposes such a flexible and dynamic distributed approach of event signaling based on the standard IP-multicast technology.

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AN.09	Aurelian Bria, KTH (aurelian.bria@anmail.se)	Nadeem Akhtar, Aurelian Bria, Simon Csaba, Ralf Jennen, Jan Markendahl, Petteri Pöyhönen, René Rembarz, Michele Rossi
	Title	Validation of the Ambient Network System Architecture
	Abstract	The Ambient Networks (AN) project develops a complete and coherent solution for control architectures in future networks. In particular, the concept of Ambient Control Space (ACS) has been proposed to support a technology-agnostic, modular and dynamic control plane. Phase 2 (2006-2007) of the project has an increased focus on validation, where two complementing tracks are being followed: prototyping and performance evaluation through simulations.

The first track is targeted at the development of an integrated prototype to prove that the different AN concepts fit together to form an integrated and coherent solution. Although a high level of detail is foreseen for this activity, the scale will naturally be limited. This is complemented by the second track which deals with large scale simulation of the system. This is needed to characterize the system performance in terms of complexity and scalability, but also to identify possible bottlenecks. The simulations focus on the Network Composition framework which is one of the key innovations of the project. Composition enables dynamic negotiation of the technical and commercial terms and conditions of the cooperation between networks, business entities and between end-users and providers. QoS and multi-technology support are key aspects of composition procedures.

In the full paper the overall validation approach will be outlined starting with the project-wide "Joint Use Cases". The description of the prototyping activities will focus on requirement engineering that led to the selection of the critical modules of the Ambient Control Space and their realization in an integrated AN testbed, validated through a set of public demonstrations. Furthermore, detailed simulation results will be presented with emphasis on aspects like capacity utilization, reachability, cost & performance trade-offs and also provide evidence that the additional AN features (e.g., composition) do not introduce excessive signalling overhead. We target different composition aspects, advertising & discovery, negotiation of composition agreements and their interaction with multi-radio access and mobility control.

The prototyping made possible a string of successful demonstrations proving that the idea of using one common control plane for the AN networks is a viable one and the ACS is able to manage and |

		control such a complex networking architecture. From the simulations, the main conclusion is that signalling load due to composition procedures is very low compared to user data, in the order of 1%, even when the amount of user data exchanged is small. To obtain a service, in a multi-provider environment, it makes more sense to negotiate "more" with a few networks as compared to negotiating "less" with several networks.

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AN.10	Robert Szymacha (szymacha@agh.edu.pl)	Robert Szymacha (AGH-UST) szymacha@agh.edu.pl Tomasz Szydlo (AGH-UST) tszydlo@agh.edu.pl Krzysztof Zielinski (AGH-UST) kz@ics.agh.edu.pl Kerry Jean (UCL) k.jean@ee.ucl.ac.uk Alex Galis (UCL) a.galis@ee.ucl.ac.uk
	Title	ContextWare architecture for Ambient Networks
	Abstract	This paper summarizes and expands the ContextWare architecture proposed for context dissemination and aggregation for Ambient Networks European research project. ContextWare deals with sources of context, the way of acquiring context data from sensors, and its distribution to interested context consumers in an uniform form. Components of ContextWare architecture are described in details. Paper specifies Context Source, which is an abstraction of context provider, Context Manager, which handles high-level context aggregation and processing, Context Coordinator, which is used for handling large set of dynamic Context Sources, and Triggering, which assures context consistency. The collaboration of these components is illustrated with a scenario, which presents usage of ContextWare architecture within AN application.