

Integration and Verification

The main objectives of the integration and verification are:

- Develop and implement specific application scenarios built upon the ACS prototype
- Ensure realisation of a project-wide ACS prototype
- Perform simulation studies on system level

This area demonstrates the benefits of Ambient Networks to end-users. In order to accomplish this, application scenarios will be developed. The scenarios consist of a storyline, which can be used for demonstration purposes. The storyline will be realised in actual networking environments. Finally the realised scenarios will be demonstrated in conferences and other events. A Joint Use Case (JUC) has been created for this purpose that is commonly used throughout the whole project.

Moreover, there is a focus on working on Gateways to Sensors networks. The purpose of this work is to enable inter-working between Ambient networks and wireless sensor networks with limited resources (energy, processing power etc.).

“Systems Evaluation” addresses integration, performance and scalability of the AN concepts. This evaluation takes an overall system view and will assess potential performance bottlenecks and unwanted component interactions and will complement the evaluation activities of other aspects within the project.

Other studies involve the overall system performance evaluation. The performance and scalability studies are intended to verify that the AN functions operate as expected and that the AN main objectives are achieved, i.e. that better overall capacity utilization is achieved; that improved access and reliability for users can be guaranteed and that end-user cost / performance ratio is improved.

The studies are furthermore expected to detect constraints to signalling inside of the Ambient Control Space and via its borders. Feedback about module performance, consistency and identified problem areas will be addressed within the results of the project.

Performance analysis will use evaluation cases with

- Specific sets of AN functionality
- Different forms of performance aspect to show/prove
- Selected networking and business situations

AN functionality

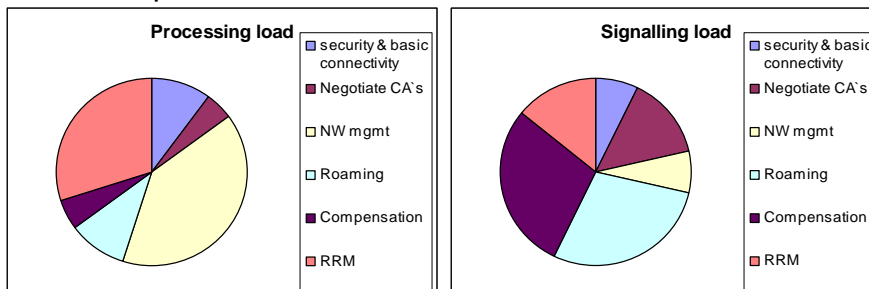
The first set of evaluation cases selected for analysis include the following functionality.

- Network advertising & discovery, evaluation & selection mechanisms
- Composition negotiations between providers including dynamic roaming
- Network extension (both technical and business wise) using overlays
- Multicast & Broadcast for AN media delivery

Examples of performance aspects

Analysis of signalling & processing load

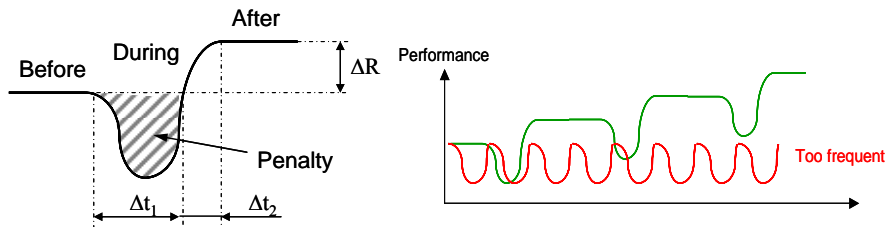
One overall question is: How much “system overhead” will be needed in order to ensure Ambient networking? The analysis can include a load budget indicating how much resources and time will be required for different actions in the use case, see examples.



Analysis of throughput and “delay” for access/connectivity

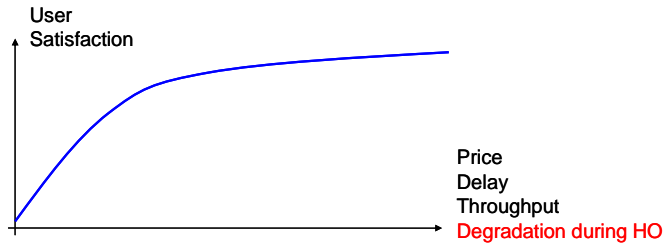
The issues to address here is how efficient the resource utilization will be with AN. In addition to overall capacity analysis other aspects could be, using handover case:

- How much time will be spent for managing the HO and will it result in overall better capacity, throughput etc?
- How large is the “Penalty of HO” and how can it be expressed.



User experience for selected applications

What will the user experience/perception be for different services when the load budgets (e.g. for advertising, composition etc) and the timing and delay characteristics (e.g. “the penalties” of always being best connected) is known and how can we express it ? One way to estimate the user satisfaction is to define a set of QoS requirements and then map these QoS requirements into Utility Functions.



Business context (situations) to be evaluated

For any combination of functionalities and performance measures the result of the analysis will heavily depend on which networking and business situation that is considered. Since new business roles and forms of cooperation is a key objective of the project, describing the multitude of situations from a business perspective has been selected. Aspects to be considered for the business context include.

- The market structure and number of actors, e.g. few traditional operators or markets with “many” network providers, brokers, trust managers etc
- The degree of co-operation (competition), mutual trust and information exchange between providers
- If the parties involved (provider-provider and user – provider) have already established relations or if they have to be established “on the fly”.

It is also important to consider “when” and under what assumptions the business relation is analysed

- What charging schemes are used: Prepaid, Pay NOW, Post-paid
- In what phase of the business relation (“when”) we analyse the situation
 - Before parties have relation but are aware (e.g. during advertising)
 - During establishment of the relation (before and during negotiation)
 - When relations is established (during CA realization)
- Assumptions are based on the status of the relation and the use of agreement
 - First time agreement (initial CA negotiation)
 - Repeated use of existing CA (e.g. commuter using a bus network)