

SCOTT: Secure COnnected Trustable Things



Roadmap toward Services

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TABLE OF CONTENTS

1	EXECUTIVE SUMMARY	5
2	OBJECTIVES	6
2.1	SCOTT General Objectives	6
2.2	WP8 Objectives	6
2.3	D8.6 Roadmap towards Services Objective	6
3	DESCRIPTION OF WORK	7
3.1	Input for the Service Roadmap	7
3.1.1	Driver and Barriers For Managed Wireless Network	7
3.1.1.1	Technology	8
3.1.1.2	Market	9
3.1.1.3	Policy	9
3.1.2	Business Goals	10
3.1.3	Product/Service Vision	11
3.1.4	Business Model	11
3.1.5	Feedback Channels	11
3.2	Wireless Managed Network Service Roadmap	12
3.3	Proposed Service Components	12
3.3.1	Physical Product	12
3.3.2	Service Product	12
3.3.3	Service Environment	13
3.3.4	Service Delivery	13
4	DISSEMINATION, EXPLOITATION AND STANDARDISATION	14
5	CONCLUSIONS	15
6	REFERENCES	16
A.	ABBREVIATIONS AND DEFINITIONS	17

LIST OF FIGURES

Figure 1 Service Roadmap 12

1 EXECUTIVE SUMMARY

This deliverable D8.6 provides a service roadmap for the managed wireless network technology. As part of the process, necessary input data is collected that should form the basis for a service roadmap. This input data include an analytical study of the barriers and drivers surrounding the managed wireless network technology, relevant business goals for smart infrastructure, relevance of product/service vision, the Business Model, and analysis of the feedback channels to make informed decisions regarding the service roadmap. The deliverable proposes the roadmap with a timeline that should allow an enterprise to implement the service roadmap with the analytical and guided information provided.

Keywords: service roadmap, managed wireless network, smart infrastructure roadmap, business strategy

2 OBJECTIVES

2.1 SCOTT General Objectives

- Focus on wireless systems to enable cooperation of wireless systems across industrial domain
- Focus on European leadership and market opportunities to address European societal challenges
- Focus on smart sensors and actuators to foster interoperability, scalability, and reusability.
- Focus on security, safety, privacy and trustability to simplify security, privacy and safety activation
- Focus on including psychological and socio-contextual enablers for trust formation
- Focus on eco-system with well-defined reusable technical building blocks
- Focus on solutions to be used in multiple industrial domains
- Focus on higher technology readiness levels to provide operational demonstrations.

2.2 WP8 Objectives

- Manage the wireless bubbles to make them secure and trustable
- Extend and connect bubbles and integrate distributed bubbles into the Cloud
- Extend the established multi-domain high-level architecture concerning security, trustability and cloud integration
- Go the last mile to market implementation

2.3 D8.6 Roadmap towards Services Objective

The objective of this deliverable is to summarize the experiences from the pilots, and create the roadmap towards market uptake. Drivers like energy efficiency, trust issues such as privacy and security, convenience, as well as market aspects such as societal demands will be analysed to create the expected market uptake of managed wireless.

3 DESCRIPTION OF WORK

This deliverable “Roadmap towards Services” is part of the WP8 Managed Wireless for Smart Infrastructure Work Package. As part of the deliverable, a study has been conducted to gather input for the service roadmap which include analysis of the innovation environment around the managed wireless technology, understanding the business objectives, service vision, business model and so on. With the collection of this needed input which identifies drivers, barriers, opportunities, and innovation potential, a roadmap is developed for the fast market uptake of the managed wireless technology.

The deliverable also collects experiences from the demonstrator conducted as part of WP8 which is documented in D8.5. Those experiences have been useful in understanding the technological advances, gaps, limitations, and potential benefits.

3.1 Input for the Service Roadmap

To be able to develop a good service roadmap, understanding the inputs is extremely necessary. A roadmap is a set of decisions and without understanding the needed inputs, those decisions could fail to deliver the desired results. Some of the necessary inputs that lies behind a service roadmap are:

- Drivers and Barriers for Managed Wireless Network
- Business Goals
- Service Vision
- Business Model
- Feedback Channel

3.1.1 Driver and Barriers For Managed Wireless Network

In today's world, technology plays an important role in the daily operation of the businesses. It supports the health industry, hospitality industry, energy industry, retail industry and many more. In these modern technological times, businesses have grown heavily dependent on these ICT systems. IT failures are a common occurrence now-a-days but for businesses, it means lost profit when the operations of their businesses are halted for technical reasons. For example, in the case of a network error, the first action of a business owner is to call the network operators and report the issue. Based on the service level agreement, the first task may be to troubleshoot the error on phone and try different solutions, or in other case, get a technician on site to help fix the problem. During all this time, the downtime of the service impacts the operations of the businesses directly and results in financial losses for the business owner. Managed Wireless technology aims to make the network infrastructure smart, and aims to tackle such issues by providing such technical services remotely, hence reducing the down time, and consistently monitoring the infrastructure to avoid such incidents. This is the innovation potential of the technology that can transform network infrastructure to be more smart, and service based.

The section looks into market barriers that may hinder the commercialization of this technology as well as identifies the drivers that may result in increased profitability. The section includes feedback from the WP8 demonstrator conducted as part of the project, as well as industry reports and research articles. The later section proposes a roadmap that should lead to commercialization and faster market penetration of the technology.

3.1.1.1 Technology

This section lists the technological barriers as well as the drivers that should lead to successful commercialization of the technology.

Barrier: As identified in the WP8 demo and documented in WP8.5, the functionalities tested in the demo requires the network devices to be able to connect to Auto Configuration Server to receive automatic configuration settings using the standard TR-069 [7]. Devices that do not support this standard would not be able to connect to the ACS and hence would not provide the desired functionalities.

Driver: One of the major technological driver is the scalability of managed wireless network. It can have thousands of devices managed at the same time by a single operator with no bottlenecks. Similarly, scalability in terms of adding new bubbles and devices easily and seamlessly is another technological breakthrough that should lead to its increased commercialization and faster market uptake. Furthermore, scalability in terms of device types is another competitive advantage of the technology. It can automate most of the network devices including switches, cameras, communication phones, routers, security appliances etc as long as they support the required standard mentioned above and is able to receive automatic configuration from the ACS.

Driver: Usability, and simplicity is another driver that should allow the technology to penetrate the market faster. With a user friendly dashboard, and ability to easily navigate all the required functionalities is a must for its success. By only needing a web browser and internet connection, smart infrastructure can be managed from any where, including trains, busses, restaurants, etc. Automation can be applied in regards to infrastructure management without the need for push button from the operator and schedules can be pre-organized in agreement with the customer. Simplicity of the technology ensures that there is no need to arrange training courses for support staff to identify and download the appropriate firmware, apply patches, remember configuration & commands, troubleshoot network quality manually and so on. As shown in the WP8 demo, and documented in D8.5, the dashboard provides a simplistic view with major functionalities available at the front hence making the UI very user friendly.

Driver: Reliability is another driver that should boost the success of managed wireless network technology. The technology is not dependent upon a consistent connectivity with the cloud management system. In case of a service breakup with the cloud, the equipment will continue to operate the way it is set up and the operation of the equipment will not be halted. It should be noted that the cloud connection is only needed when there is a change needed in the current device setup which is not often required. Hence, the technology is reliable in this regards.

Driver: The technology offers better security compared to the current operative procedures. The technology allows for rolling out firmware patches and updates on day one when they are announced, hence protecting the customer in the fastest and efficient way possible. This is normally not possible with manual operations where an operator have hundreds of devices at hand and requires several weeks and some times months of travelling to schedule, and update the security patches manually.

Driver: One of the major driver of managed wireless network technology is to offer data analytics for intelligent insights regarding network operations, network performance, network status, client throughput, channel utilization etc. It allows for traffic profile to be visible to each hour of the day, each day of the week, and each week of the month, hence providing a vast amount of data for analysis, service improvement, and troubleshooting. Furthermore, historical data can be utilized for gaining increased insight, efficient decision making, and predicting future behaviour by applying machine learning and data science tools to it. While the current demo presented in WP8 does not have these analytical functions as of now, it nonetheless presents an opportunity to build these

functionalities in the future and make it a competitive advantage against the competing market technologies.

Measure to tackle technology barriers: As stated above, one of the major barrier regarding commercialization of the technology is that the related access points and other devices should be supporting TR-069 protocol to be able to receive configuration from the ACS server.

3.1.1.2 Market

Barrier: As reported in D8.1 for the wireless management framework, there are two ways of achieving a centrally managed wireless network for smart infrastructure i.e. hardware based wireless management and cloud based wireless management. In hardware based wireless management, one of the biggest market barrier is the installation of new hardware controllers in the enterprise premises to provide distributed wireless management, load balancing, and reliability [4]. This requires CAPEX for new devices that support relevant technological protocols for smarter infrastructure, hence the larger the enterprises the biggest investment in new devices. As reported in D8.1, one main disadvantage of this hardware based managed network is that it requires dedicated access points and controllers which creates interoperability issues with other vendors manufacturing APs. This is the main market barrier for hardware based managed wireless network. Whereas in a cloud based wireless managed wireless network, this complexity of installing controllers on premises is removed which makes it easier to operate. In the case of having AP that support the required protocols for the ACS, this barrier can be tackled by equipment leasing rather than equipment procurement. It is especially important as the life cycle of several equipment in this domain is more or less three years, and it needs to be updated to support advance technologies. Hence, equipment leasing is a better strategy.

Driver: A major advantage of the technology is the ability to offer better customer service i.e. serving large number of customers in short span of time. Efficiency and effectiveness of customer service is increased, while cost is reduced, and it is all enabled by automatic configurations, and remote monitoring.

3.1.1.3 Policy

Barrier: One of the major barrier is the achievement of different certifications which is needed to ensure and show that customers data are protected. For example, in the US, compliance with HIPPA [5] is needed which is a Healthcare standard for devices operating in the healthcare domain. One such certification ensures that privacy and security of patient data is respected. This certification will be needed for the cloud services as well as for the devices installed in the healthcare industry. Similarly, compliance to protect customers card data, and prevent them from online frauds i.e. Payment Card Industry Data Security Standard (PCI DSS) [6] will be needed also.

Barrier: EU General Data Protection Regulation GDPR [7] is a regulation to safeguard the privacy and security of European citizen's data being collected by any entity in the world. This law defines the scope related to privacy and security of data when it is collected, processed, controlled, or utilized. Any operations involving the EU citizens data must ensure compliance to this regulation. Hence, the cloud managed wireless network technology must ensure that the law is appropriately interpreted and implemented to ensure compliance.

Barrier: EU Cloud Code of Conduct (EUCOC) [8] sets out recommended procedures to providing security to data in the cloud systems. Hence, all the data regarding device location, network management information, device owner, traffic data profiling, customer details, etc must ensure

compliance with EUCOC. Such code of conducts and regulations ensure that the customers can continue to put their trust in digital products and digital solutions without worrying about their privacy and security of sensitive information.

Measure to tackle policy barriers: When it comes to policy related barriers, it needs some efforts at the business level to bring about compliance and implement the necessary actions to be able to achieve required certifications. For example, in the context of GDPR, it is required technical as well as operating procedures to ensure that the privacy and security of European citizens is not compromised. It requires knowledge of the regulation itself and its many laws, for example:

- Article. 5 which deals with principles about processing of personal data.
- Article. 6 which deals with establishing lawful grounds of personal data processing.
- Article. 12 – 22 which deals with Data subject rights (access, data portability, right to be forgotten, etc.)
- Article. 25 & 32 which describes that entities should be implementing necessary protection measures to protect the personal data of the data subject.

To apply these articles and stay in compliance, changes are needed at the policy level, procedures and processes level, as well as changes at the technical level of the solutions developed. Similar procedures and technical implementation tasks are necessary to be in compliance with the EU Cloud Code of Conduct (EUCOC) also and vice versa.

Once implemented, these barriers can turn into commercialization drivers for the technology and will speed up its market penetration knowing that customers data is well protected and privacy is respected. It is especially a pre-requisite at many industrial and public bodies to implement only certified technologies, and such certifications will pay the way for faster commercialization of the technology.

3.1.2 Business Goals

The roadmap should be a reflection of the company goals. This means the roadmap should clearly define what are the company ambitions, what is the vision, and for that vision, what are the focus areas a business is going to prioritize. It should also list a set of Key Performance Indicators that should allow to measure the progress and guide if the ambitions in the focus areas are reached or not.

In the case of Managed Wireless Network, the business goals that are aligned with this new technological revolution are:

- Achieve higher service quality management by remote monitoring and using analytics.
- Improve customer satisfaction and retention by achieving best response time to their technical solutions.
- Increase market share, and shareholder value by serving a large pool of customers through the use of smart infrastructure
- Using smart infrastructure to cut operations costs and increase net profits

These objectives can be further measured through establishing KPIs. The drivers identified in the section above achieve these business goals.

3.1.3 Product/Service Vision

The service vision defines how one aims to change the world in future through this service. It answers the basic questions like what problem are we aiming to solve, and what will the future look like when that problem is solved. It should also aim to make a certain impact in future, and make world a better place as a result of this service.

In the case of Managed Wireless Network, the primary vision is to enhance performance, security and trustability of wireless services in homes and buildings through the novel concept of smart infrastructure. This vision eliminates the basic customer issues regarding gateway reboot, gateway updation, gateway security, and enables a seamless customer service with enhanced performance, and trustability.

3.1.4 Business Model

A business model is a set of decisions incorporating questions like how to generate customer value, how to capture it, and how to deliver it to the customers. A good business model lays down foundations for a profitable and sustainable company. Knowing the business model of the enterprise is another major input to consider before developing a service roadmap. It always comes up to which function is the best to chose as part of our service i.e. Function A vs Function B, or which activities should be conducted as part of the service and which activities should be excluded. The answer to such questions lies in understanding the business model of the enterprise and if the company is operating in low-cost high volume market, or high-cost low volume market and vice versa.

In the case of Managed Wireless Network, the business model focuses on many important aspects like cost structure, revenue channels, value propositions, value delivery, customer relationship etc. the value propositions here reflect the business goals, the product/service vision, as well as takes into consideration the current market barriers, as well as the drivers that should appeal to the customers. The drivers identified above i.e. Usability, and simplicity, and customer service lays ground for value propositions.

3.1.5 Feedback Channels

This input to the roadmap collects feedback from the customer channels where customers have been complaining about certain functions, or demanding changes to certain activities, or are unhappy or satisfied with other functions. While the feedback list could be very large, and it may not be practicle to go through all the feedback provided, it is nonetheless a good exercise to go through some feedback provided on certain channels and pin point the most important feedback provided. This feedback should then be considered when developing the service roadmap.

In the case of managed wireless network, a large amount of customer feedback is already collected by project partner EyeSaas which is reported in D22.4. According to D22.4, traditionally, majority of the customer calls, roughly 75%, are related to WiFi, and the first line customer support staff addresses the challenges by asking standard questions, like

- Did you reboot your device?
- Have you tested the speed by cable?

To be able to develop a good service roadmap for managed wireless network, customer feedback channels need to be analysed, such that the offering is aligned to the customer needs, as well as it enables to achieve the business goals and service vision.

3.2 Managed Wireless Network Service Roadmap

The input provided in the section above establishes ground for the necessary service related decisions that can be accompanied with a timeline to implement it. A study of barriers, and drivers regarding managed wireless network informs the business strategy as well as the product/service strategy. One such study utilizes six months on average to incorporate the barriers and drivers and have it aligned with the business goals. Similarly, to utilize one such analytical study of barriers and drivers, a product/service vision can be established in five months time. This also involves study of the current Business Model, upgradation of the model with relevant propositions, and addition of new value streams which shall utilize on average six months. It should be noted that beside the technological, market, and regulatory study, the evaluation of customer feedback is of equal importance. One such study of feedback channels should be conducted throughout the service design process and all the relevant channels i.e. email, phone calls, survey results, etc should be analysed, evaluated, and analysed.

A graphic representation of one such service roadmap is provided in the figure below:

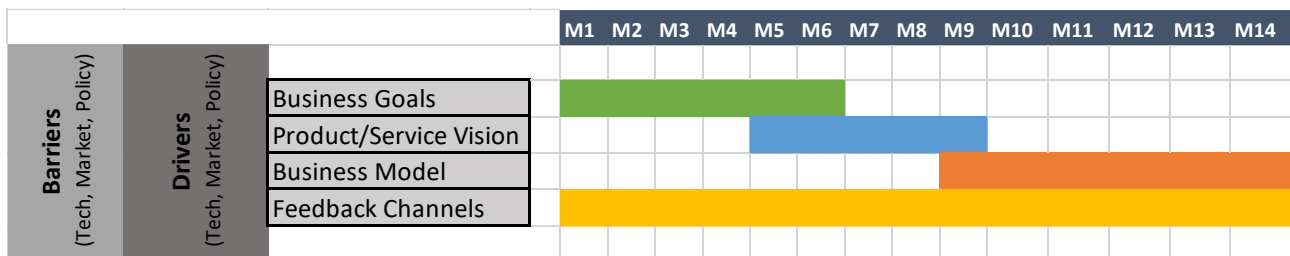


Figure 1 Service Roadmap

3.3 Proposed Service Components

The following are the proposed service components for the managed wireless network service:

3.3.1 Physical Product

The physical product is comprised of the hardware provided by the Internet Service Provider. This may include gateways supporting the needed protocols, cameras, or other devices required to be installed and managed. These devices should support connection to the cloud management systems, as well as should be able to receive commands from the remote management servers. This component also involves security of the devices, and the secure communication network it is part of. This service component should consider the technological barriers discussed in the section above.

3.3.2 Service Product

This component is comprised of the value drivers discussed above. This include processes by which customer satisfaction is achieved, and also processes that shall enable enhanced quality of service, reliability, and trust. Some of the necessary processes in this service product are:

- Achieving faster customer response by implementation of remote configuration
- Achieving better security by timely updations of firmware

- Delivering quality of service by setting up automatic updates and through remote monitoring of quality of service
- Achieving customer trust by acquiring the needed certifications in safety and security

3.3.3 Service Environment

The service environment refers to arts and artifacts in the business environment where service is delivered. Apart from arts and artifacts, it may also include the spatial layout of the environment, the lighting, the physical setup, and objects placed in the environment. Such objects in the environment also refer to the target market of the business and the intended service being delivered to them.

In the case of managed wireless network, it may include cloud images, video presentations, and posters that explain the service regarding smart infrastructures. One such service environment may also include short guidelines and customer testimonials. Apart from the physical environment, the same objects can be represented on the world wide web also. For example, video presentations, testimonials, and guidelines can be provided on the website, YouTube, and social media where the service is delivered or sold.

3.3.4 Service Delivery

The service delivery refers to the actual actions that are being conducted as part of the service delivery. This may involve activities that are being planned earlier in the physical product, service product, and service environment sections and now conducted to deliver what is being promised to the customer. This may or may not be the same as what is actually planned.

In the case of managed wireless network, it involves activities in the cloud management system and the needed functionalities that are implemented to deliver the service. It also involves the usability of the system and the ability to easily find functions that are needed at certain times and occasions. Furthermore, it also involves the sequence of activities that needs to be followed in certain order to be able to deliver the service.

4 DISSEMINATION, EXPLOITATION AND STANDARDISATION

The main purpose of this deliverable is to develop a service roadmap for the managed wireless network technology developed in WP8. The deliverable is shared with the WP8 partner and leader EyeSaas since it is interest to their businesses. The deliverable also provides valuable information for all project partners within SCOTT.

For external viewers, SCOTT decided to make this document public so that other projects have the opportunity to benefit from this work and exploit the outcomes and methods provided. Such external viewer may comprise business entities, R&D institututes, or other larger European research projects.

5 CONCLUSIONS

This deliverable concludes a service roadmap for the managed wireless network technology. This service roadmap and the analytical work being conducted, provide a basis for the novel service in smart infrastructure and allow for leveraging the drivers identified in this study. The deliverable initiates with identifying the needed input data to develop a service roadmap. This needed data includes identification of the drivers and barriers in the technological landscape, the business, and the regulatory landscape. The analytical work then focuses on the importance of business goals, the service/product vision, the business model, and feedback channels as the main contributor to the service roadmap. The study then proceeds on building up on the data collected to propose a roadmap and service components.

6 REFERENCES

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A. ABBREVIATIONS AND DEFINITIONS

Term	Definition
BB	Building Block
TL	Technology Line
UC	Use Case