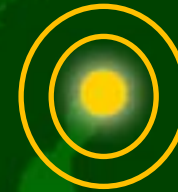


The Future Internet Public-Private-Partnership
Nice, 12 March 2010



Innovative Regional Future Internet Infrastructure



Case Oulu

Mika Rantakokko
CFO

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Contents

- Oulu – some basic facts
- Collaboration as a basis for FI infrastructures
- Examples of FI PPP activities and innovative infrastructures in Oulu



Some basic facts about Oulu

- The largest city in the northern Finland with 135 000 inhabitants
- Largest regional R&D expenditure per capita in Finland
- Globally strong in the wireless ICT;14 000 ICT jobs in region
- Wired Magazine ranked Oulu #3 "Silicon Valley" in late 90's
- Good business infrastructure
- City's central administration is very pro ICT and R&D
- Oulu has a long tradition in co-operation between education and research institutes, companies and public sector.
- Enthusiastic and innovative individuals



Oulu has proven track record in ICT innovation

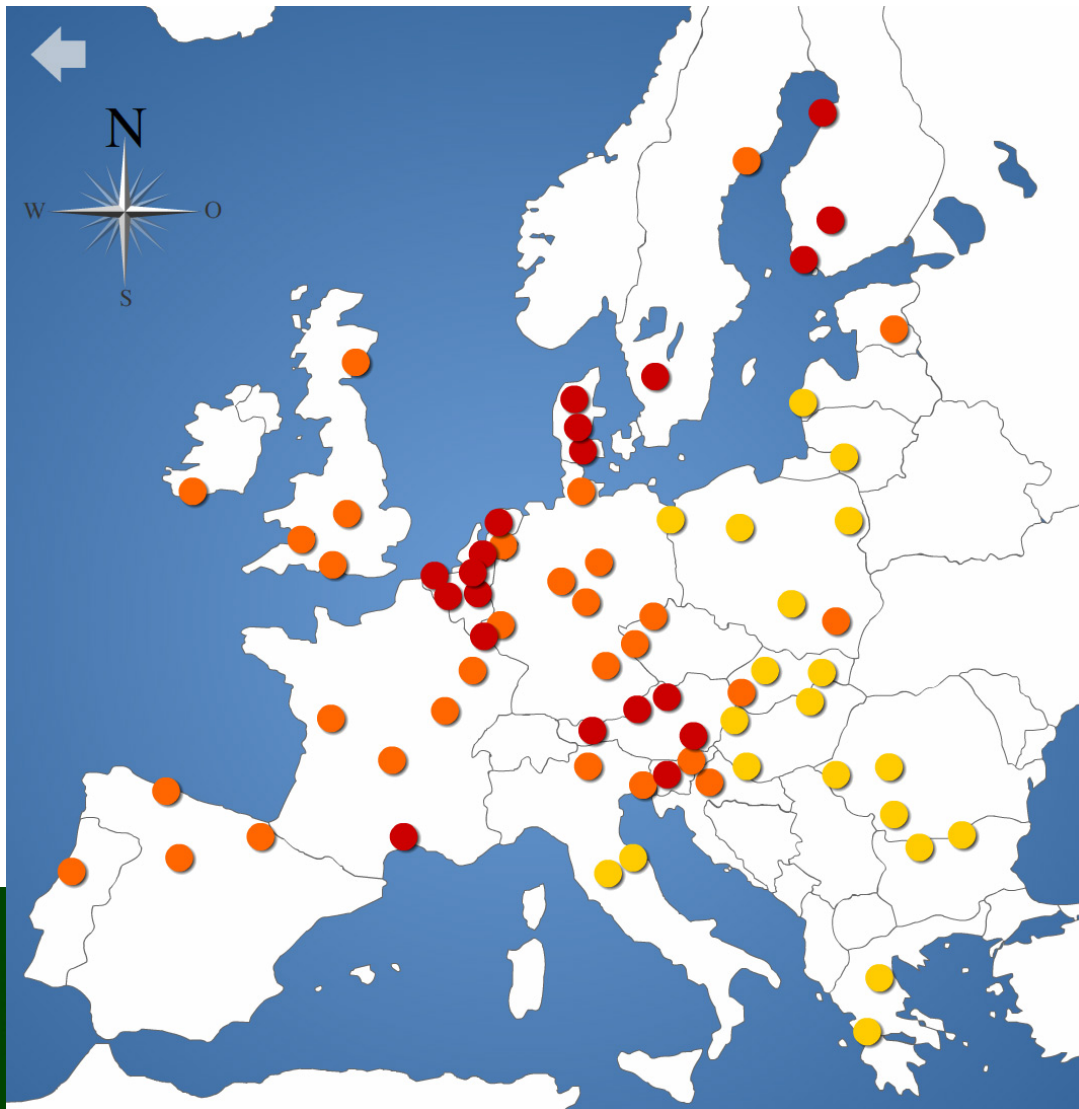
Some examples...

- The first phone call over a cognitive radio network 2010
- The world's first WCDMA (3GPP) telephone call 2002
- The world's first WCDMA telephone call 1996
- The 1st contactless fare collection system for public bus transportation 1992
- The world's first GSM telephone call 1991
- The world's first GSM base station early 1991
- The world's first NMT network early 1981
- The world's first wrist watch heart rate monitor 1980



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Smart City Oulu – ranking among European medium-sized cities



- 1 Luxembourg
- 2 Aarhus
- 3 Turku
- 4 Aalborg
- 5 Odense
- 6 Tampere
- 7 Oulu
- 8 Eindhoven
- 9 Linz
- 10 Salzburg
- 11 Montpellier
- 12 Innsbruck
- 13 Graz
- 14 Nijmegen
- 15 Groningen
- 16 Gent
- 17 Ljubljana
- 18 Maastricht
- 19 Joenköping
- 20 Brugge

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Latest collaborative step in Oulu – Oulu Innovation Alliance

- Alliance formed between the City of Oulu, University of Oulu, Oulu University of Applied Sciences, VTT Technical Research Centre of Finland and Technopolis
- The ultimate target of the Oulu Innovation Alliance agreement is to keep Oulu as an internationally acknowledged center for innovation.



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Oulu Innovation Alliance focus

- The OIA founding partners are committed
 1. To focus their operations, education, research and development activities on agreed innovation areas.
 2. To invest in the development of agreed infrastructures.
 3. To create and develop mechanisms for mutual use.
- The initial focus areas were agreed as **Internet research**, printed electronics, international business, environment and healthcare sectors.



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“Internet everywhere – the next opportunity”

- CIE aims to **create internet-driven growth opportunities** by combining cutting-edge innovations and open networks with agile new business creation.
- CIE’s role is to combine the best ideas, people and resources from different fields of industries and science for **co-creation of next generation internet technologies, appliances and services**.
- CIE projects are **multi-disciplinary** with the main focus is in technology but closely linked with application development, usability and social sciences.
- CIE drives for the **Living Lab approach** to obtain user-driven innovations to empower ordinary people to experiment and contribute for the Future Internet.



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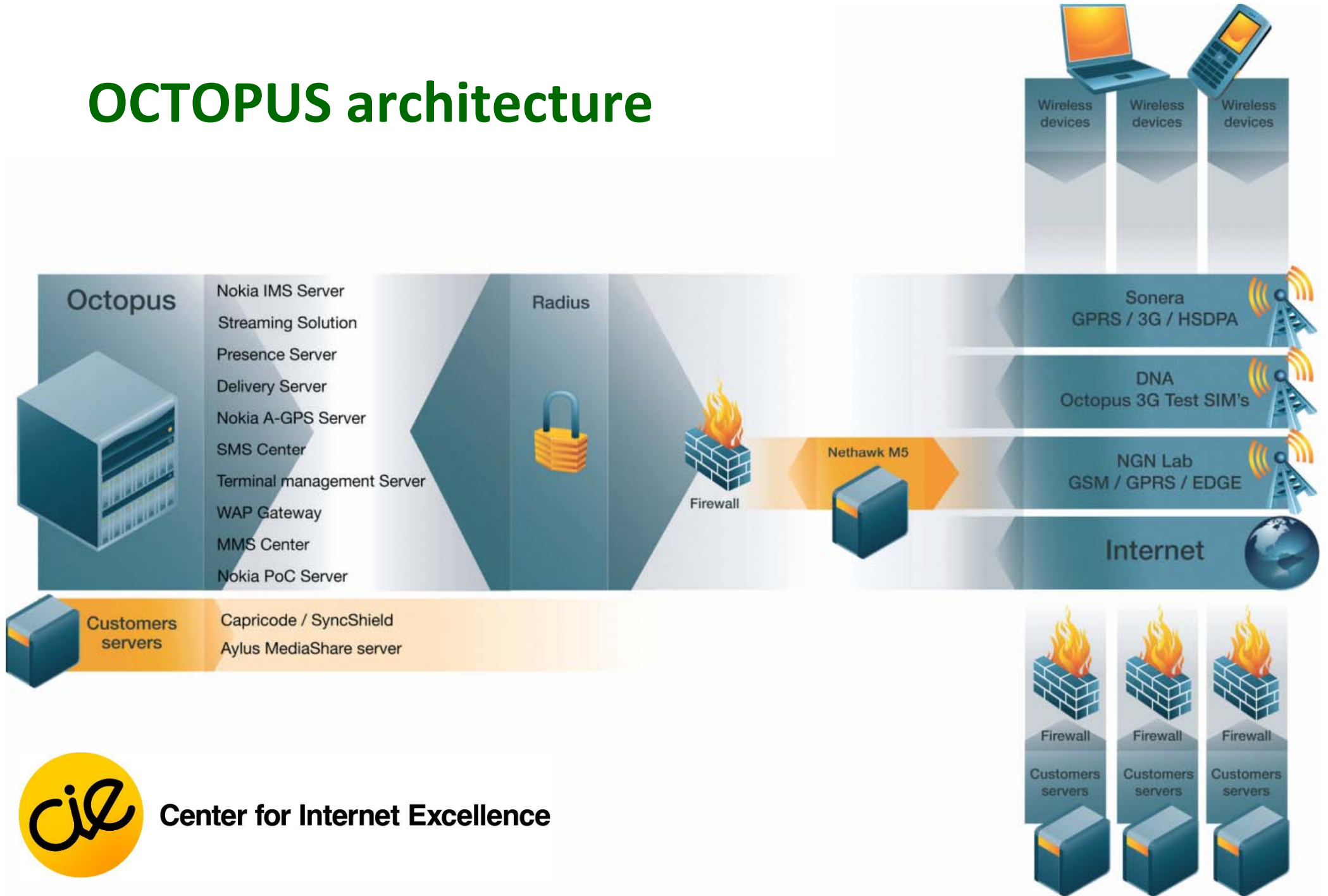


- Octopus Network, established in 2002, is an authentic and independent operator grade testing environment.
- Octopus offers a closed technological environment, a testbed, to develop and test mobile services and technologies.
- In addition to the technical testbed it also provides different kinds of services like testing support, training and real test user groups.
- Octopus ecosystem contains several companies and research- and educational institutes.
- Octopus is a member in several European Union and Tekes funded projects; Panlab-P11, Netlab, Finlab
- Global clients in testing; for example overseas test laboratory of Yokosuka Research Park.



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OCTOPUS architecture



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UrBan Interactions (UBI) program

- Large multidisciplinary R&D program
- Ambitious goal: functional prototype of future Ubiquitous City
 - > Impose a visible and lasting change on the society
- Research hypothesis: by deploying new infrastructure and services into the urban space we make it a "better" place for people
- Research approach
 - Multiple projects
 - Develop novel prototype services atop the infrastructure
 - Evaluate prototype services in field trials in true environment of use
 - Stimulate user-driven open innovation
 - Stimulate SME's to contribute with their own expertise

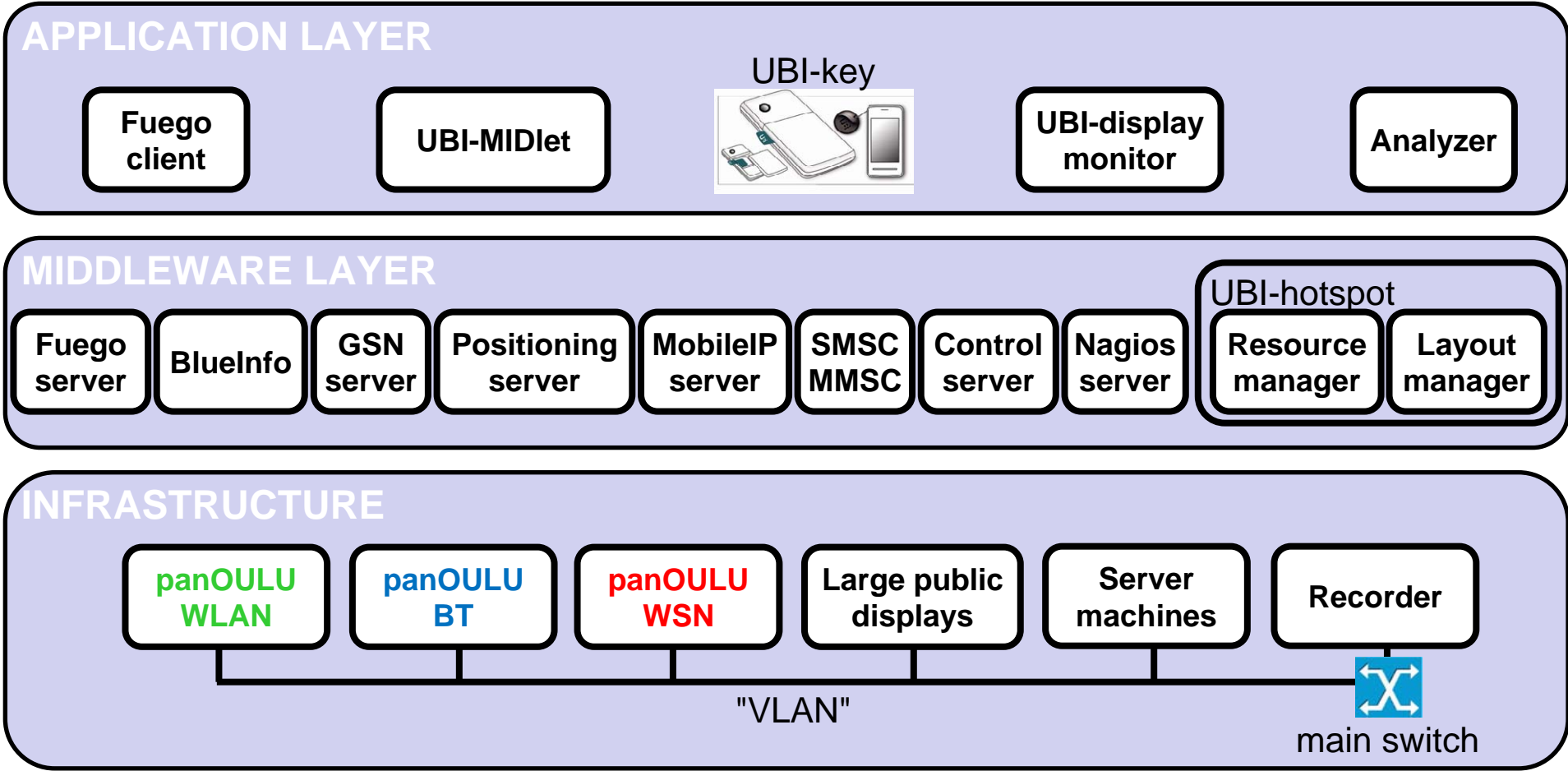


UBI objective: Building blocks for ubiquitous city

- UBI Open Urban Service Network
 - Deployment of new urban computing infrastructure into the city
 - Organize the heterogeneous computing resources with UBI-middleware
 - Open = anybody can provide and use services atop the network
 - Open source software for supporting user-driven open innovation
- UBI DEMOs and PILOTs
 - Functional prototype applications and services demonstrating the capabilities of ubiquitous city
 - Society and users do not know what they need or can do you have to show them what you can do and how to do it!
 - City as a smart urban space - City as an interface
- Special focus on personal smart phone as interaction device



Testbed architecture



Ojala T, Kukka H, Heikkinen T, Linden T, Jurmu M, Kruger F, Hosio S, Sasin S & Närhi P (2010) **Open urban computing testbed**. *TridentCom 2010, Berlin, Germany, to appear.*





- City-wide multi-provider WLAN network
 - Provided by a consortium of 13 public organizations and 4 ISP's
 - ~1200 WLAN access points throughout the Oulu region
 - ~500 AP's within 1000 m radius of city center
 - City center blanketed with 60 AP WLAN MESH network
 - AP's from multiple vendors (Cisco, Linksys, Siemens, Strix, Buffalo)
- Provides open and free wireless Internet access
 - Open: no user accounts or registration required
 - Free: no payment
- More information: <http://www.panoulu.net>
 - List and map of access points, usage statistics, etc.
 - Promotional panOULU video by Strix Systems
http://www.strixsystems.com/video/Strix_PanOULU.html



panOULU WLAN: Usage

- Open and free wireless internet access to general public
 - Used by ~20 000 WLAN devices every month
 - 30-40% of users are visitors, ~30% of devices are WLAN-phones
- R&D resource used by numerous projects
- Supplementary services
 - WLAN AP ID positioning of user device (<http://www.panoulu.net/location>)
 - SMTP server for sending email
- Backhaul connectivity for various purposes
 - City of Oulu's parking signs and video surveillance cameras
 - panOULU BT access points
 - panOULU WSN access points
- Example applications
 - panOULU Conqueror - pervasive location-based game played in the panOULU network



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Ojala T, Hakanen T, Salmi O, Kenttälä M & Tiensyrjä J (2008) Supporting session and AP mobility in a large multi-provider multi-vendor municipal WiFi network. Proc. ACCESSNETS 2008, Las Vegas, NV, 89-101.

UBI-displays

- Large UBI-displays
- Interactive public displays
- Indoor version is 1-sided
- Outdoor version is 2-sided
- <http://www.ubioulu.fi/node/13>



Open Ubiquitous City Challenge ("UBI-challenge")

- **Open challenge to global R&D community: Design, implement, deploy and evaluate novel urban computing application in Oulu UBI testing environment**
- **Motivation**
 - Provide R&D community opportunity to demonstrate their expertise in application development in open "urban computing testbed"
 - Provide R&D community opportunity to transfer their ideas from the lab into real-life urban living environment
 - Stimulate global research collaboration on urban informatics in a concrete way
- **Tentative timeline for 1st UBI-challenge**
 - 1st International UBI Summer School 2010 in Oulu (June 2010)
 - Submission of written entries (Sep 30, 2010)
 - International jury selects entries to be deployed in Oulu (Oct 2010)
 - Deployment in Oulu (June 2011)
 - Collection of empirical evidence (Jul-Aug 2011)
 - Reporting, awarding the recipients nominated by international jury (Sep-Oct 2011)



Oulu Urban Living Labs - OULLabs

- The Oulu region is known for the intensive collaboration between companies, public sector and universities. “Triple-Helix” has been good base for the co-operation for years. Now by putting more emphasis on **people, OULLabs** forms “Quadruple Helix” - *an unique opportunity for co-creation of new innovations.*
- OULLabs, coordinated by CIE, is established to further develop Oulu region to exploit the existing infrastructures and networks to test and develop utilization of user centric knowledge for better appliances and services for inhabitants.



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Oulu FI PPP potential and strengths

- Regional committment
 - Public sector guarantees the continuity
 - Test communities – existing and new ones
- Technical test environments:
 - UBI environments; displays, sensor network etc.
 - Octopus (test bed network, service)
 - panOULU (test bed, network)
 - V-Lab (test environment, education)
 - VTT Converging Networks Laboratory
 - TT Kaakkuri - wireless hospital (test environment, service)
 - Future Schools – pilot school environments
- Living Labs (OULLabs, NorthRULL, etc.)
- Development programs – UBI program – FI PPP



Thank you!

For more information:

www.cie.fi

<http://www.ubioulu.fi>

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