

CLEEN

Cluster for Energy and Environment

Measurement and monitoring in CLEEN Research Agenda

Presentation in MIKES EMRP seminar May 19, 2009

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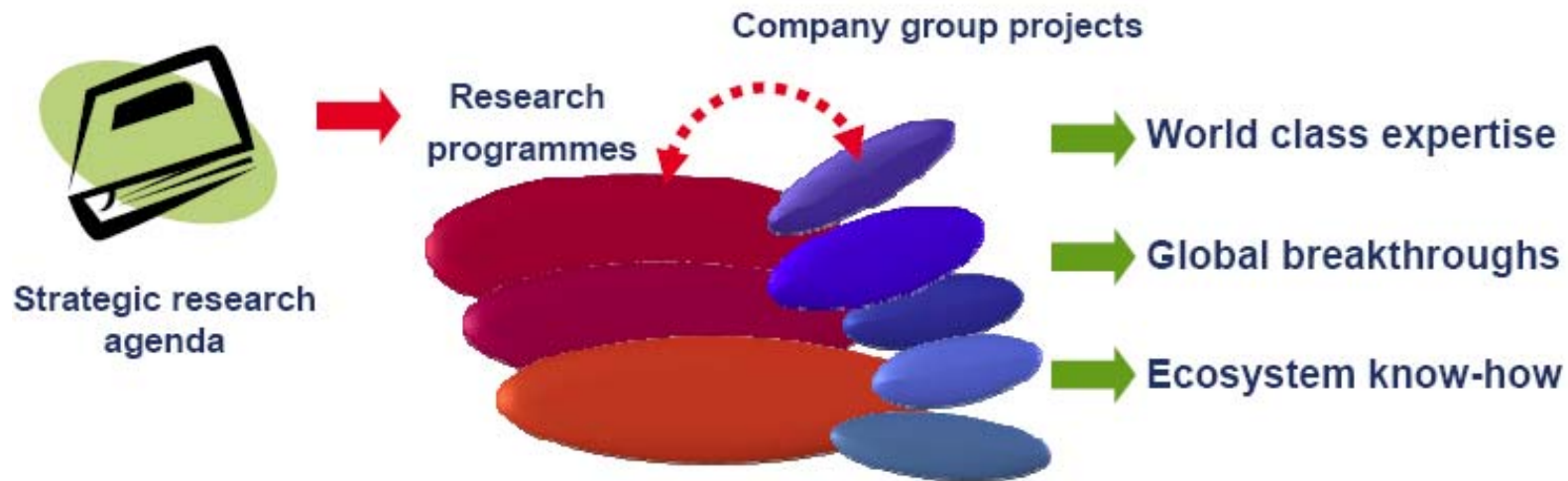
SHOK = Strategisen huippuosaamisen keskus Strategic centres for science, technology and innovation

- The strategic centres offer top research institutes and companies utilising research results a new way of carrying out close, long-term cooperation.
- In the strategic centres, companies, universities and research institutes will agree on a joint research plan. The plan will aim to meet the application needs for practical application by companies within a five to ten year period.
- In addition to shareholders, public funding organisations (most importantly: Tekes) will commit themselves to providing funding for the centres in the long term.
- Six centres are in operation
 - Forest cluster: **Forest Ltd**
 - Information and communication industry and services: **TIVIT Ltd**
 - Metal products and mechanical engineering: **FIMECC Ltd**
 - **Energy and the environment: CLEEN Ltd**
 - Built environment innovations
 - Health and well-being (launched in April 2009)

CLEEN strategic research areas

1. Carbon neutral energy production
2. Distributed energy systems
3. Sustainable fuels
4. Energy market and smart grids
5. Efficient energy use
6. Resource efficient production technologies and services
7. Recycling of materials and waste management
8. **Measurement, monitoring and assessment of environmental efficiency**
 - **Development of assessment methodologies (incl. Life Cycle Models)**
 - **Assessment of the environmental effectiveness**
 - **Development of on-line monitoring technologies**
 - **Service and business models**

The strategic centres' operating principle



Research programme

- Creates a strategic competence base and a foundation for applications
- Aims to
 - strengthen core competences
 - develop joint research tools and environments

Company group project

- Utilises and/or supports the research carried out in the research programme
- Establishes structures and channels for utilising research results
- Generates ecosystem know-how

Research Program Proposal: **Measurement, Monitoring and Environmental Efficiency Assessment**

Goals

Develop new technologies, methods, tools and services in the areas of environmental measurement, monitoring and environmental efficiency assessment in order to

- 1) create new business
- 2) support other CLEEN research areas as a cross-disciplinary program.

Program volume: target appr. 4 M€ / year

Proposed program schedule

- Research plan ready and funding application filed to Tekes before 30.10.2009
- Program launched beginning of 2010
- Program duration 5 years (2010-2014)

Contents

Platform projects (target 5-10 years)

- Interoperable Measurements
- Environmental Efficiency Assessment

Applied research projects on selected focus areas (target 3-5 years)

Demonstration project: CLEEN Testbed

+ Related company group projects

Platform Project Proposal 1

Interoperable Measurement Systems

Content

Development of an interoperable, quality controlled measurement & monitoring platform to enable more efficient utilization of measurement data in environmental monitoring, energy production, industrial processes, civil infrastructure, safety and crisis management and consumer and other end-user applications.

Technology areas to be developed are:

- Advanced solutions for **collection, storage and distribution of measurement data**
- Embedded **quality control** for enhanced data and network reliability
- Efficient use of **metadata** (e.g. "plug-and-measure" capability)
- **Open interface specifications** for environmental observation systems
- **Data fusion and modeling**
- **Decision Support Systems**

Adaptation of relevant standards (**INSPIRE** EU-directive, **OGC** SWE standards etc.) and participation in their development is essential. Early demonstrations and basic infrastructure building urged to support other CLEEN programs. Collaboration with TIVIT Oy (**EnviTori** & related projects)

Horizontal project that supports other CLEEN programs by delivering measurement & monitoring tools

Interoperable Measurements Work Packages (preliminary)

WP1 Project management

WP2 Measurement network architecture

- development of reference architecture for integrated environmental monitoring network

WP3 Integration of data quality

- calibration & traceability processes, quality control tools and algorithms, integration of quality in data messaging (flagging etc.)

WP4 Efficient network operation

- metadata management, diagnostics & maintenance tools

WP5 Interfaces for interoperability

- INSPIRE compatible web services (close co-operation with EnviTori)
- interfaces to other measurement system domains: process automation, building automation, vehicles,...

WP6 Data fusion, modeling

- Advanced data fusion and modeling tools

WP7 DSS

- Decision Support Systems

WP8 Dissemination

- public website, workshops & seminars, articles, conference presentations
- participation in standardisation work

Platform Research Project 2

Environmental Efficiency Assessment Tools

Content

The objective is to enable industry and authorities to evaluate and monitor environmental efficiency of products and processes, by

- Developing an internationally accepted, interoperable system for environmental efficiency assessment and monitoring
- Integrating the environmental efficiency monitoring system to the monitoring and data management systems of companies and organisations.

The system includes embedded quality assurance operations, methods for estimating energy efficiency and life cycle modelling. For measurements it utilizes the Interoperable Measurements platform. Model for localization is also developed to support export. Demonstrations/pilots required.

Horizontal project that supports other SRAs.

Proposed applied research project

New monitoring technologies

Content

Development of new environmental sensing & monitoring technologies and tools

- process emission monitoring
- particle measurements
- environmental remote sensing (radar, satellite)
- water quality

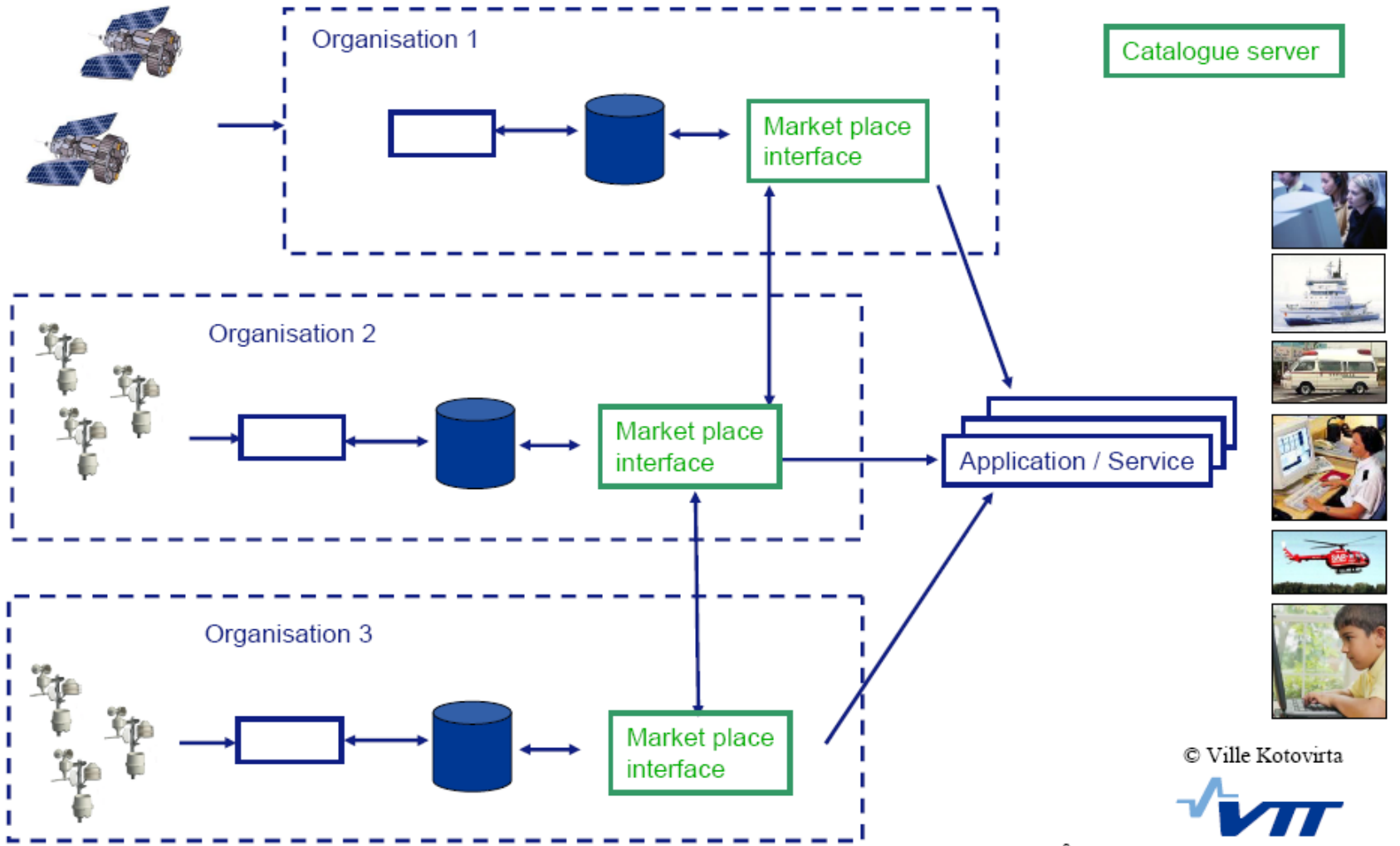
Proposed Demonstration Project

CLEEN Testbed

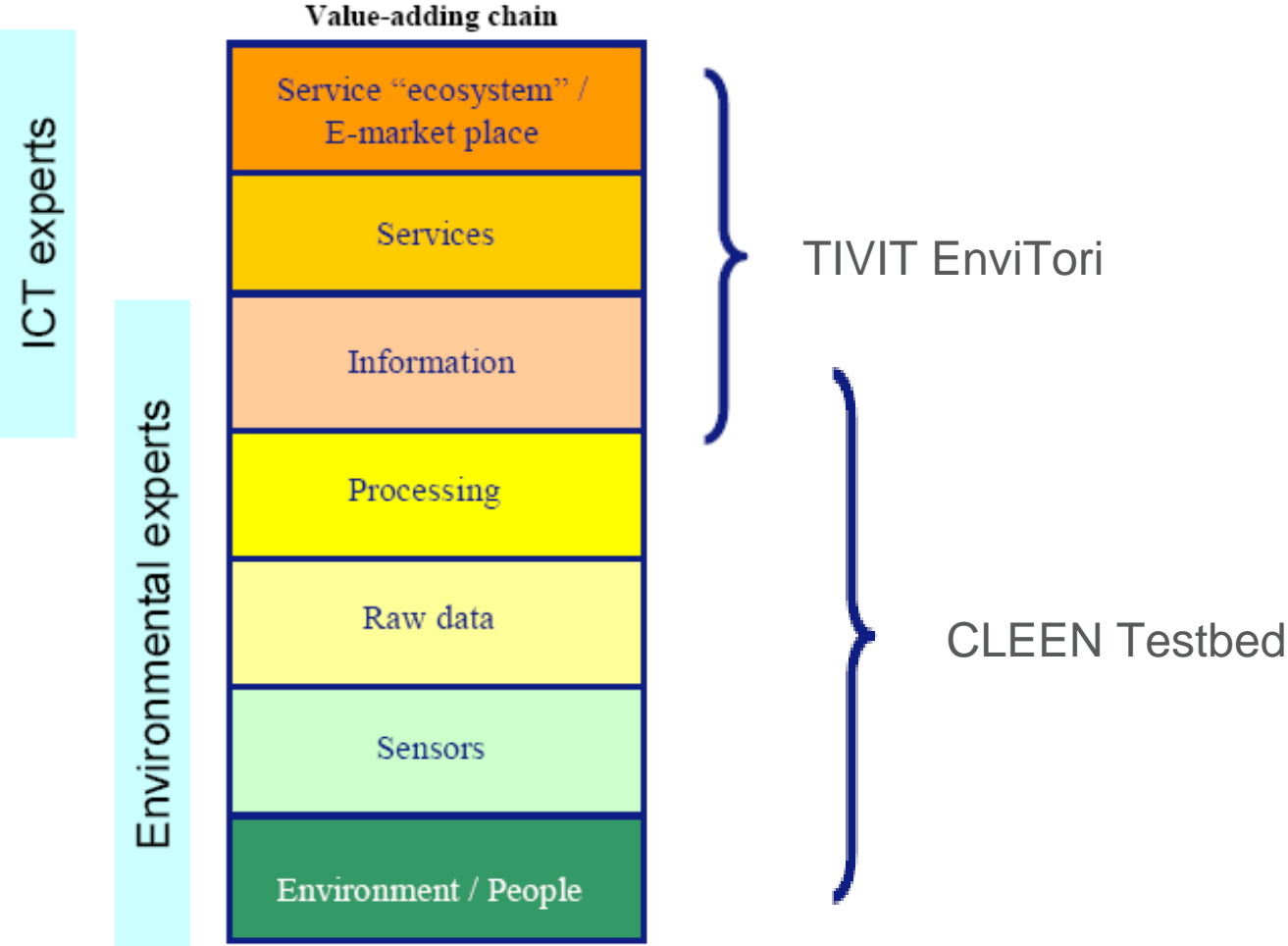
Content

- Extension of Helsinki Testbed (<http://testbed.fmi.fi>) to cover - in addition to weather - also other environmental observations (air quality, hydrology, marine research, agriculture, radiation...), as well as measurements needed for energy efficiency applications.
- Co-operation with TIVIT EnviTori.
- Preparation for INSPIRE EU directive: building data interfaces for existing monitoring systems.
- Demonstration of an integrated environmental efficiency assessment and monitoring system.
- Collaborative testbed(s) with international partners.

TIVIT EnviTori – market place for environmental information

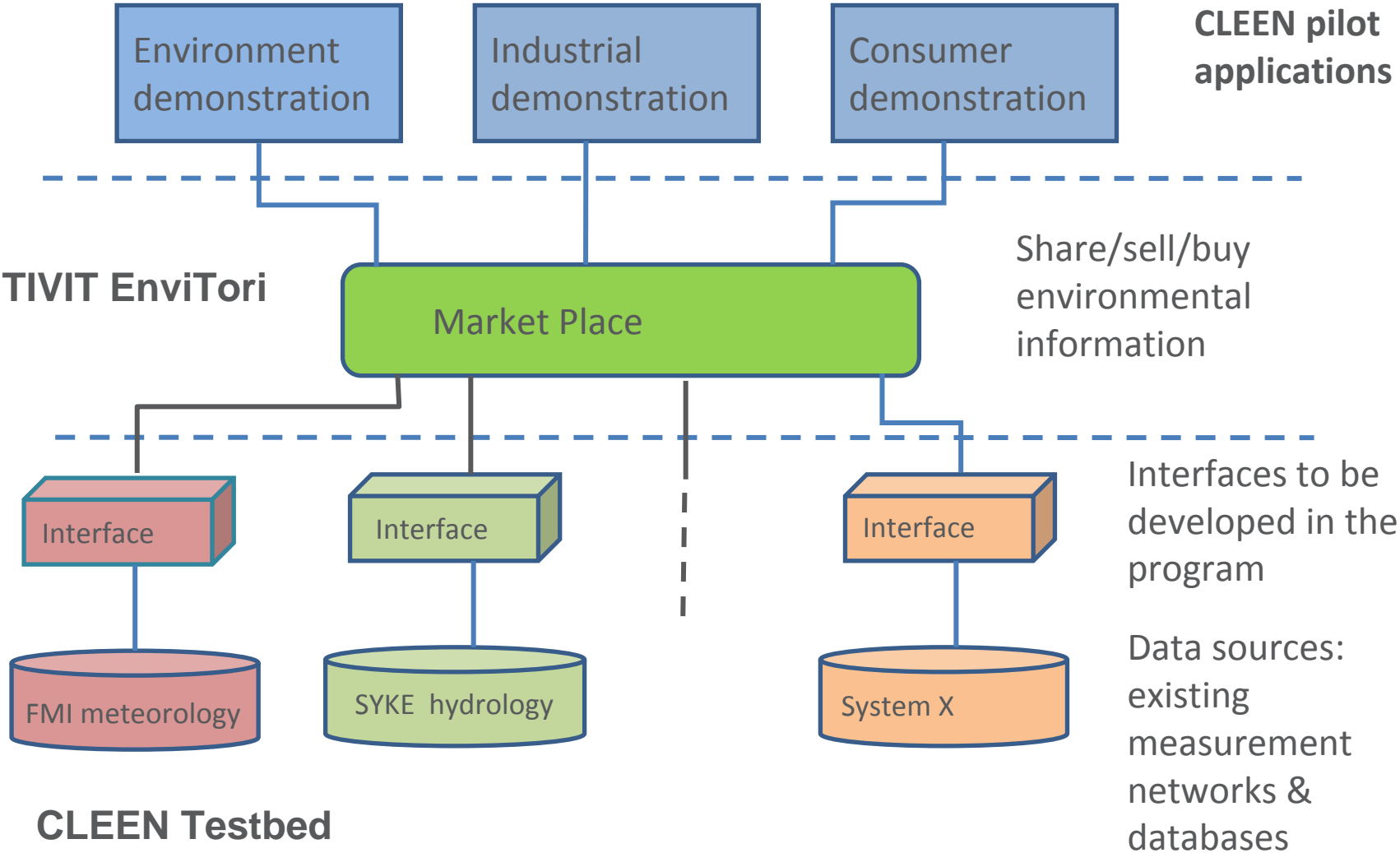


CLEEN Testbed will bring contents to EnviTori

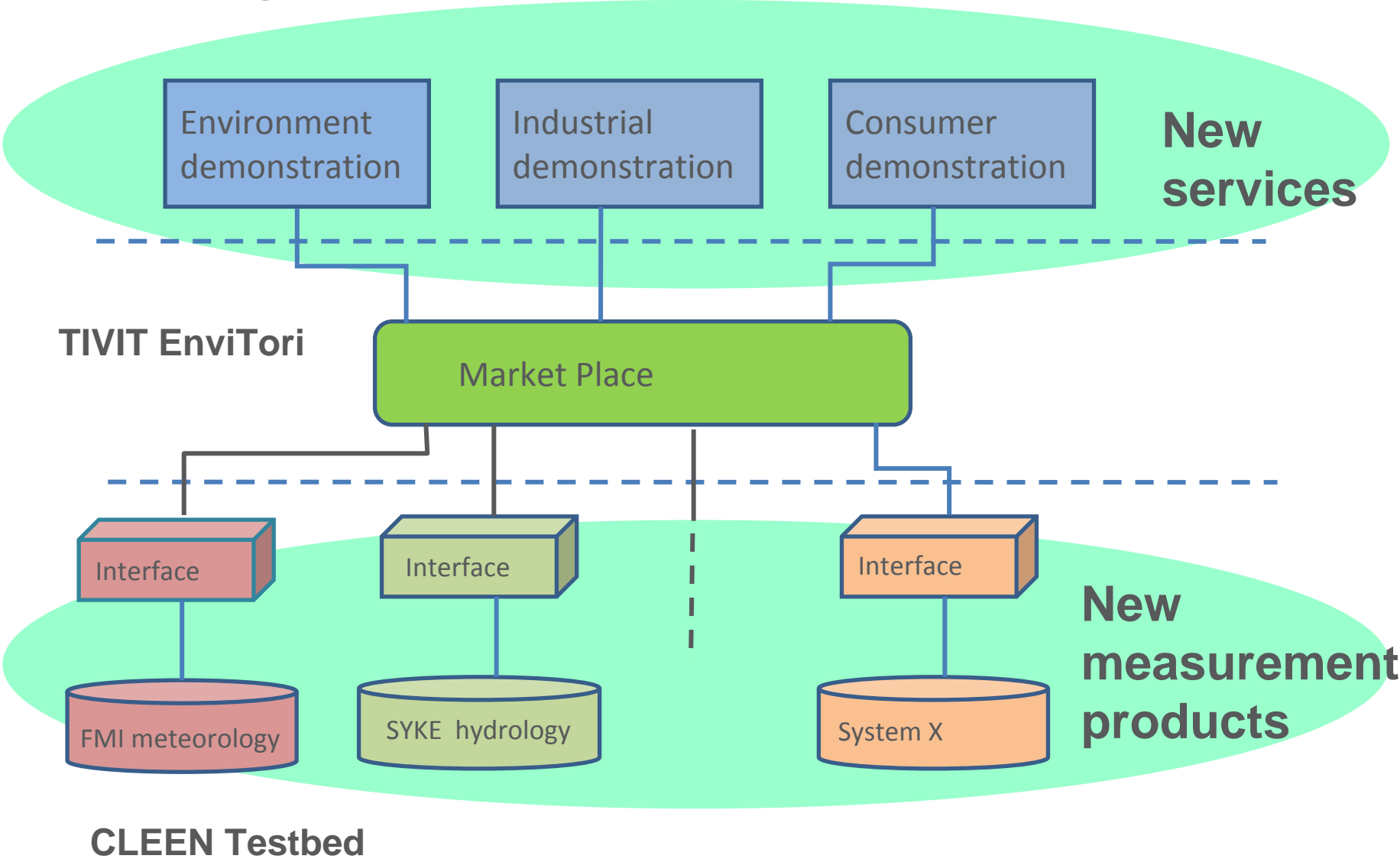


Value-adding chain figure by Ville Kotovirta/VTT

Together CLEEN Testbed, EnviTori and CLEEN demonstrations create a prototype of an integrated, interoperable environmental service ecosystem



Special Work Package: Fast Track to help SME's to utilize CLEEN Testbed in developing new products & services



Next steps

1 Consortium building

- participating companies & research institutes
- updated program draft
- preliminary funding plan

⇒ Consortium Memo **target: June 2009**
letter of intent – type ; no commitment yet

2 Program planning

- research plan
- budget & funding plan
- consortium members' commitment to funding required

3 Funding application to Tekes **target: Oct 2009**

4 Consortium agreement

5 Program launch **target: Jan 2010**

Interested to participate?

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CLEEN SRA8

Measurement, monitoring and environmental efficiency assessment

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