Open Three (O3) Consortium on GARR and GÉANT networks: an Italian open source initiative to test and implement an advanced e-health European Living Lab in Italy and Europe

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O3-Consortium

SSIC-HECE

*(Studi superiori di Ingegneria Clinica- Higher Education in Clinical Engineering)*

SSIC HECE

Who are we?

- SSIC-HECE (Studi Superiori di Ingegneria Clinica - Higher Education in Clinical Engineering) directed by Prof. Paolo Inchingolo
  - Bioengineering and ICT Group (BICT) of the University of Trieste
- More than 25 people working on different fields
- Laboratories
  - HTL, Health Telematics Laboratory
  - ANL, Advanced Network Laboratory
  - OSL, Open Source Laboratory
  - Neuromodelling
  - Bioengineering

Long History
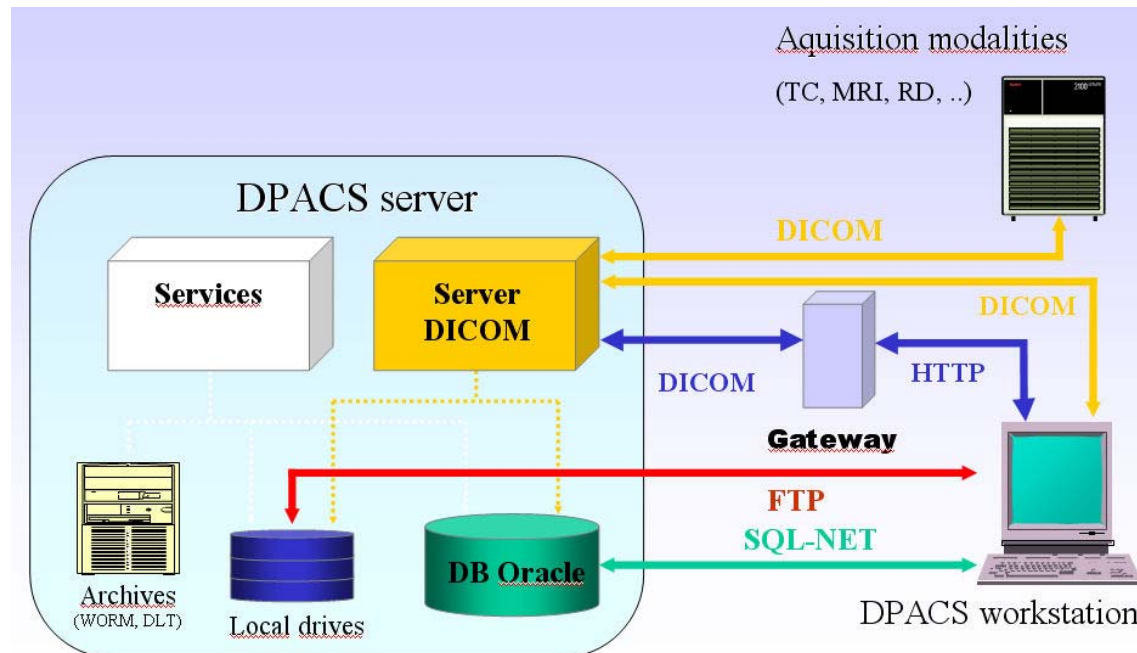
The research of Bioengineering and ICT group of UniTS (BICT) together with HECE started in **1991** after:

the first PACS system was installed in the Cattinara hospital (Trieste) in ***1988, the first European installation*** of a commercial PACS system in a hospital enterprise

Despite being so innovative, it was early clear that the proprietary installation was forcing users to adapt to the system and not vice versa

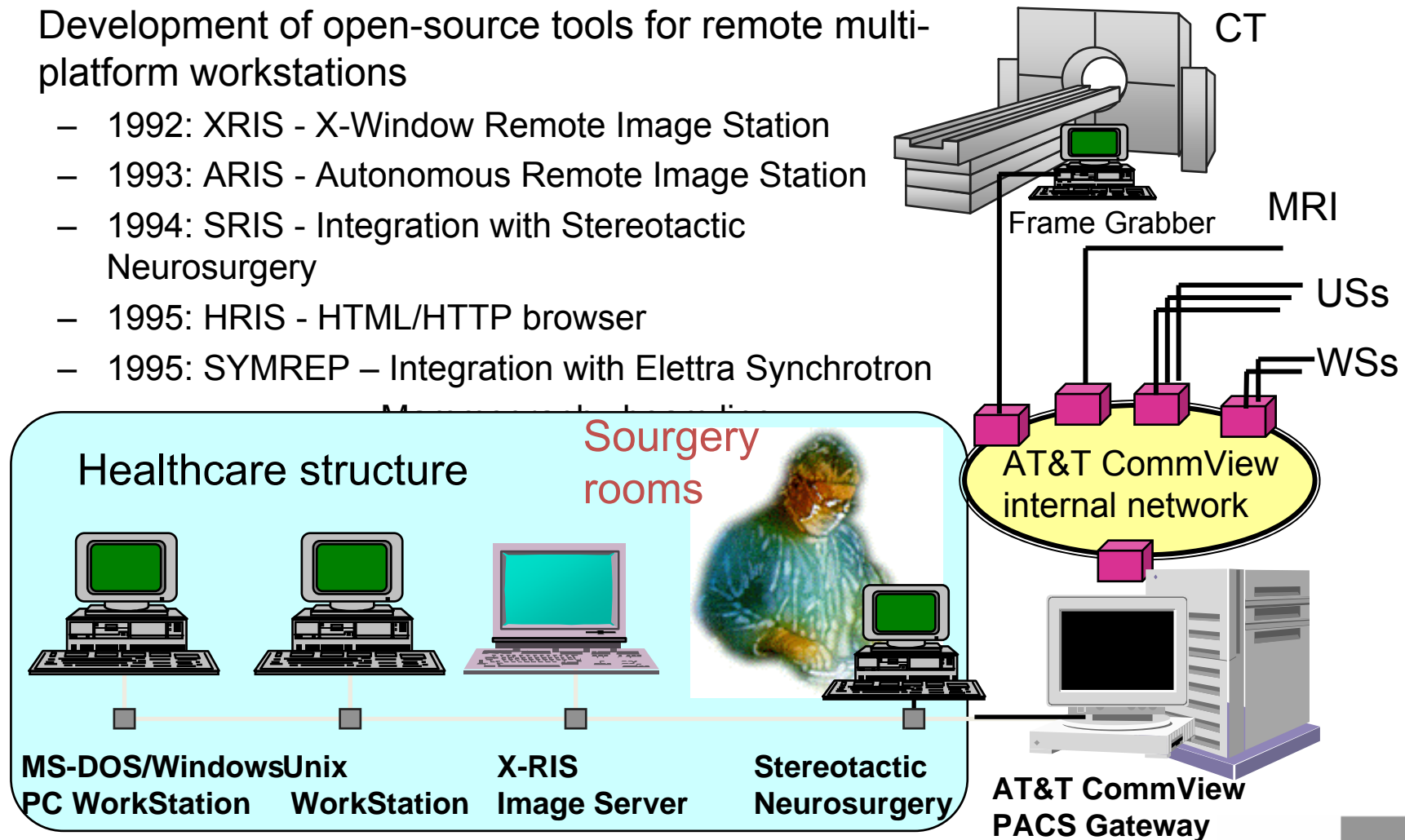*-> research in **Open Pacs Systems** started*

The Open-PACS (O-PACS) Project

- Development of open-source tools for remote multi-platform workstations
    - 1992: XRIS - X-Window Remote Image Station
    - 1993: ARIS - Autonomous Remote Image Station
    - 1994: SRIS - Integration with Stereotactic Neurosurgery
    - 1995: HRIS - HTML/HTTP browser
    - 1995: SYMREP – Integration with Elettra Synchrotron

CT

Frame Grabber

MRI

USs

WSs

AT&T CommView internal network

Healthcare structure

Sourgery rooms

MS-DOS/Windows PC WorkStation **Unix WorkStation** **X-RIS Image Server** **Stereotactic Neurosurgery**

AT&T CommView PACS Gateway

➡ 1995, the <u>Data and</u> Picture Archiving & Communication System (DPACS) project:

◆ proposal of a new concept of integrated clinical systems

➡ goal to collect, store, retrieve, distribute at any level (hospital, private clinic house, territorial body, etc.) all the relevant information related to each European citizen.

➡ implemented at Trieste in 1997

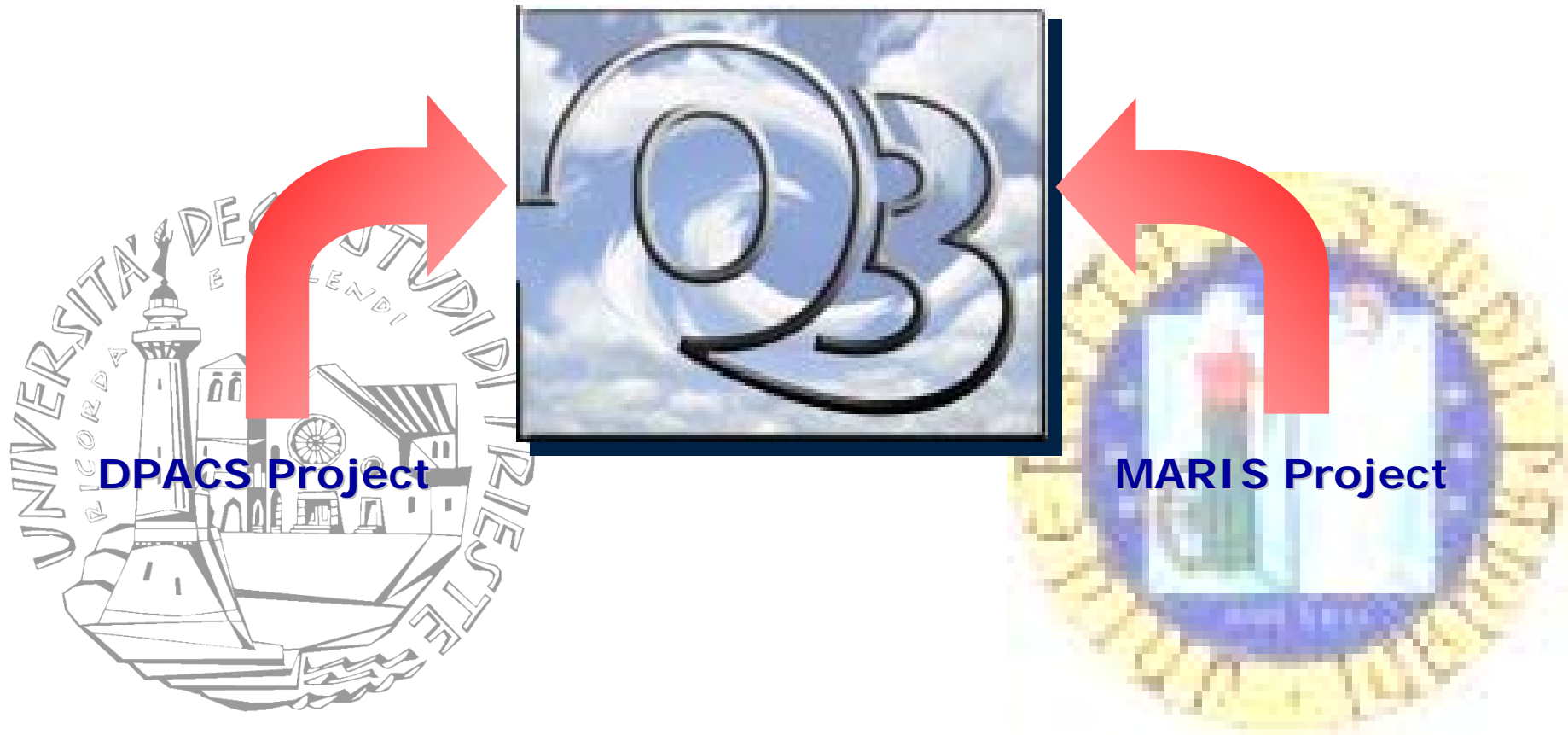# EuroPACS-MIR 2004 in the enlarged Europe

Trieste,
16-18 September 2004

➡️ discuss and propose *innovative and organizational solutions for the ICT-based integration of the health systems in the enlarged Europe*

The Open Three (O3) Consortium project

DPACS Project

MARIS Project

SSIC HECE

What O3 Consortium is?

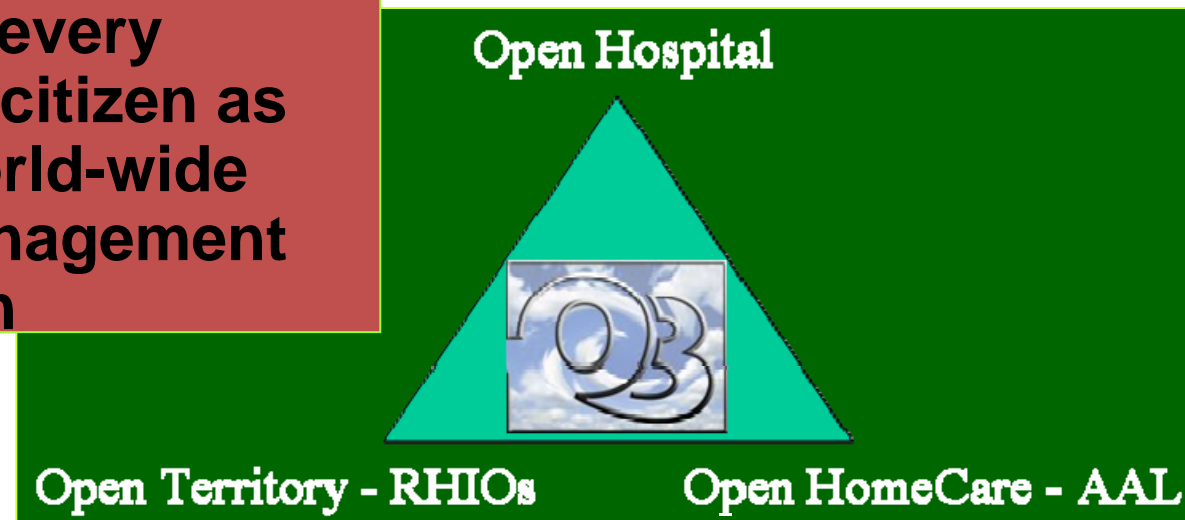- An inclusive project to cover the 3 main aspects of the future of e-health in Europe and in the world:
  - e-hospital,
  - e-territory,
  - e-vital (tele-home-care, Ambient Assisted Living)

  with **open-source** and **open system interconnection** ICT solutions
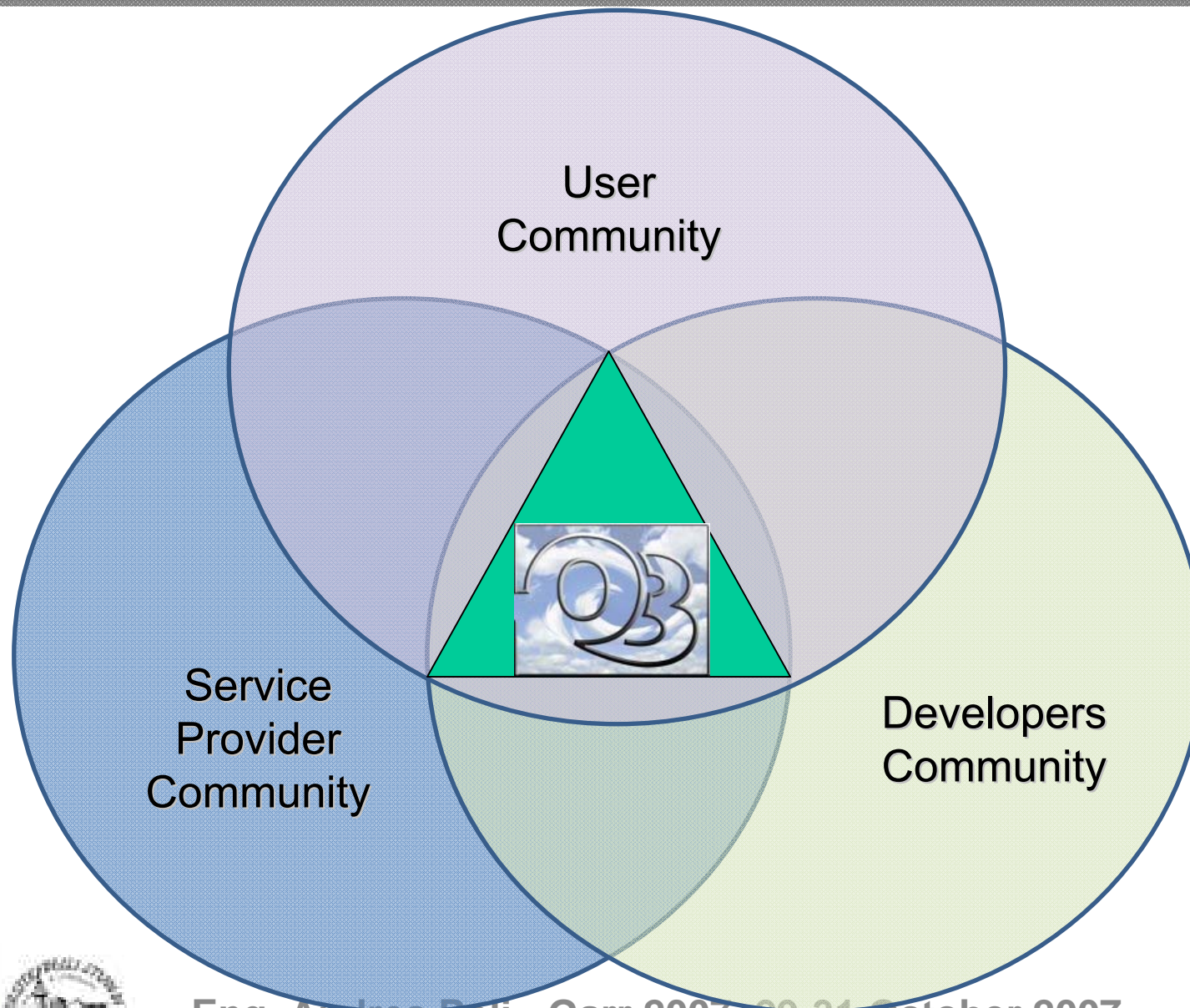
- Including e-learning (education and long-life-education), and new mobile communication devices

The mission:

to promote an integrated three dimensional Health Policy for every European citizen as well as world-wide health management integration

Open Hospital

Open Territory - RHIOs

Open HomeCare - AAL

User
Community

Service
Provider
Community

Developers
Community

O3-Consortium Community

➡️ **The community (user, developers and service provider) is currently made of**
- ◆ the international network ABIC-BME
- ◆ the international network ALADIN
- ◆ about 70 bilateral cooperation Agreements of the Higher Education in Clinical Engineering (HECE), University of Trieste, with
  - ▪ Universities
  - ▪ Hospitals
  - ▪ Medical Research Centers
  - ▪ Healthcare Enterprises
  - ▪ Industrial Enterprises
  - ▪ Governmental Agencies

O3 Main Collaborations

- Mortara-Rangoni
- World VistA
- General Hospital of Teheran
- TBS Europe
- AGFA Europe
- University & Hospital of Maribor
- GE HealthCare Europe
- University-Hospital Enterprise of Padua
- University & Hospital of Pisa
- University-Hospital Enterprise of Trieste
- Metascan in Cyprus
- Advance Medical Laboratories
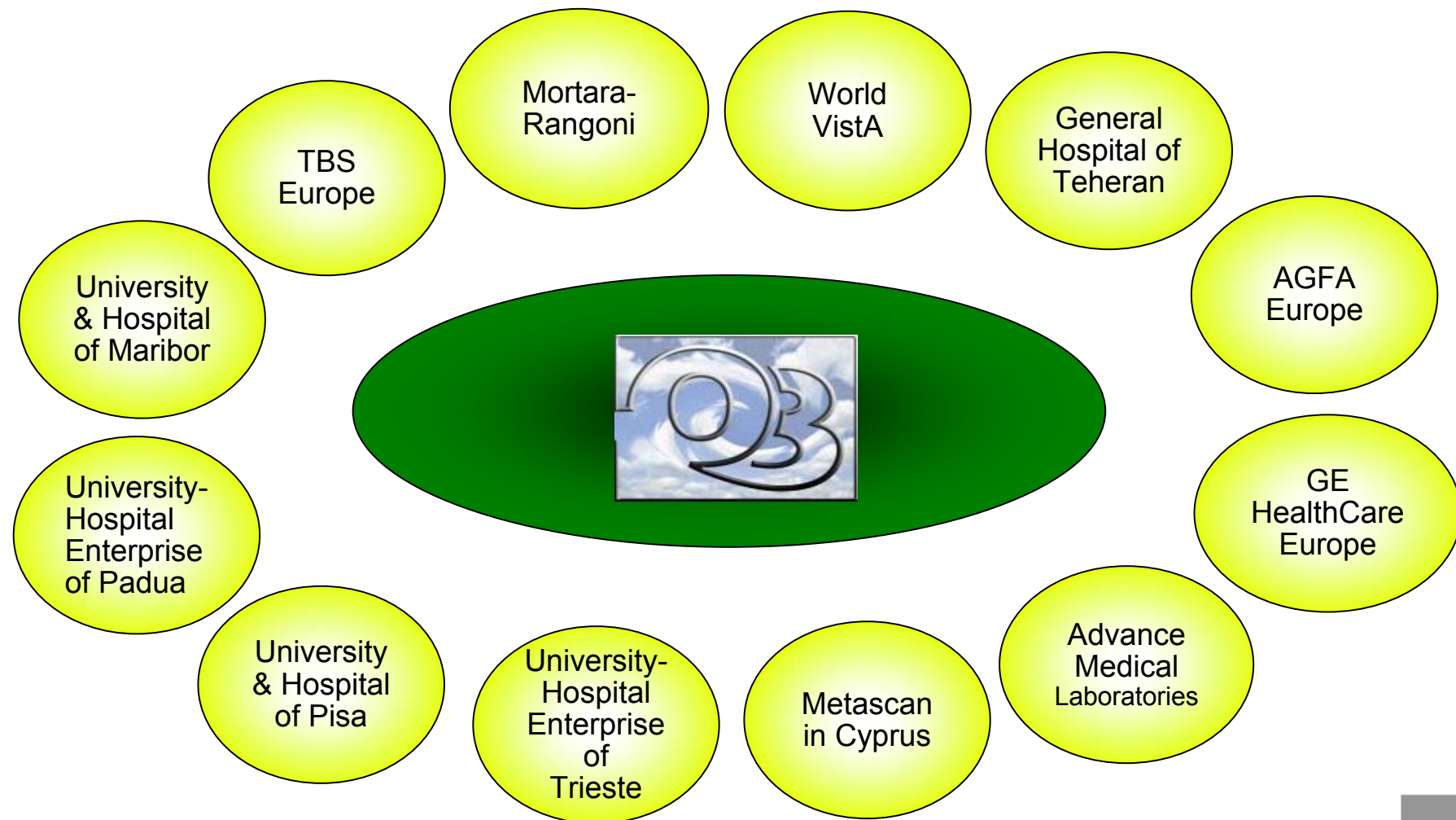
O3-Consortium as Living Lab

➡ During year 2006, O3-Consortium was presented by Prof. Inchingolo as a "Living Lab"

  ◆ The Living Lab Network is a new model proposed by the European Community for fostering innovation and sharing knowledge

➡ It is a collaborative model in which Universities, Research Centers, Enterprises, Governmental Agencies and **Users** work together for:

  ◆ **Reducing the gap between services and citizens.**

➡ Users/Citizens are at the center of the process.

O3-Consortium and research networks

➡ The coordination of the communities and the delivery of services to the citizens need fast and secure communication.

◆ Trials and research are done across research networks

- GARR
- GEANT

O3 characterization

- Citizen-centric approach
- Scalability
  - at any range, up to national and international dimensions
- Open Standard (DICOM, HL7, etc.)
- Interoperability - 100% adherence to IHE
- Open Source
  - to facilitate wide diffusion and re-use
- Java and Web technologies
  - to facilitate portability

Multi-centricity and Internationalization

- To support national services in multi-language areas and trans-national services

full independency of

- data-base
- OS
- HW
- language

IHE = Interoperability!

- O3's "bricks" are built according to IHE "Actors"
  - usually IHE "Actors" are built on the already existent systems to achieve IHE compliancy
- O3's information flows are built according to IHE Integration Profiles
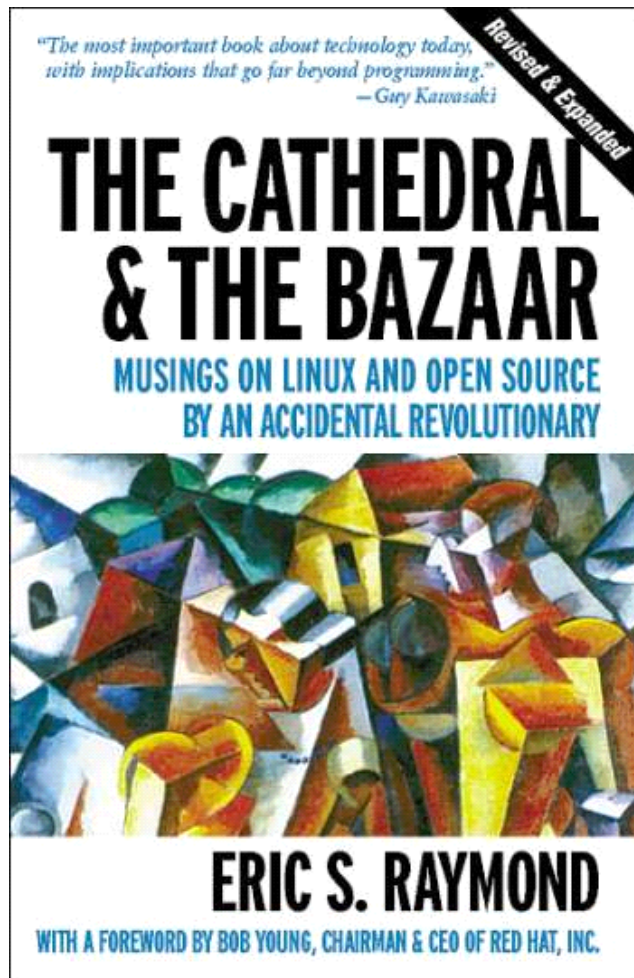 - usually IHE "Integration Profiles" are built on the already existent systems to achieve IHE compliancy

IHE Conformity

→ Participation to European Connectathon 2005 (NL)

→ Participation to European Connectathon 2006 (ES)

◆ Tested adherence to 15 profiles on 19 actors

O3-Consortium and Open Source

- Open Source is a new definition of the meaning of "Free Software" started in early '80
  - It could be potentially confused:
    - "Free" means no money?
    - NO!
  - Free should be intended not as
    - "Free Sandwich"
  - But as
    - "Free Speech"

Open Source Concepts

"The most important book about technology today, with implications that go far beyond programming." — Guy Kawasaki

Revised & Expanded

THE CATHEDRAL & THE BAZAAR

MUSINGS ON LINUX AND OPEN SOURCE BY AN ACCIDENTAL REVOLUTIONARY

ERIC S. RAYMOND

WITH A FOREWORD BY BOB YOUNG, CHAIRMAN & CEO OF RED HAT, INC.

➡ In this book, Eric Raymond, one of the biggest guru of open source community, describes two opposite models about the writing process of OS system:

- ◆ the cathedral model
- ◆ the bazaar model.

Cathedral Model

➡️ "fully crafted by individual wizards or small bands of mages working in splendid isolation"
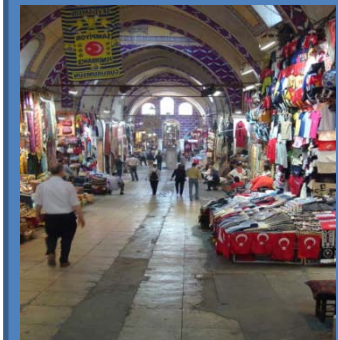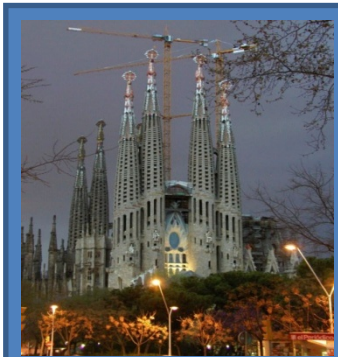
◆ Roles well defined

- Project design
- Project management
- Project implementation

➡️ Users are passive!

Bazaar Model

- ➡ "a great bazaar of differing agendas and approaches"
  - ◆ Creative Collaboration
  - ◆ Roles not clearly defined
  - ◆ Great integration across developers and users
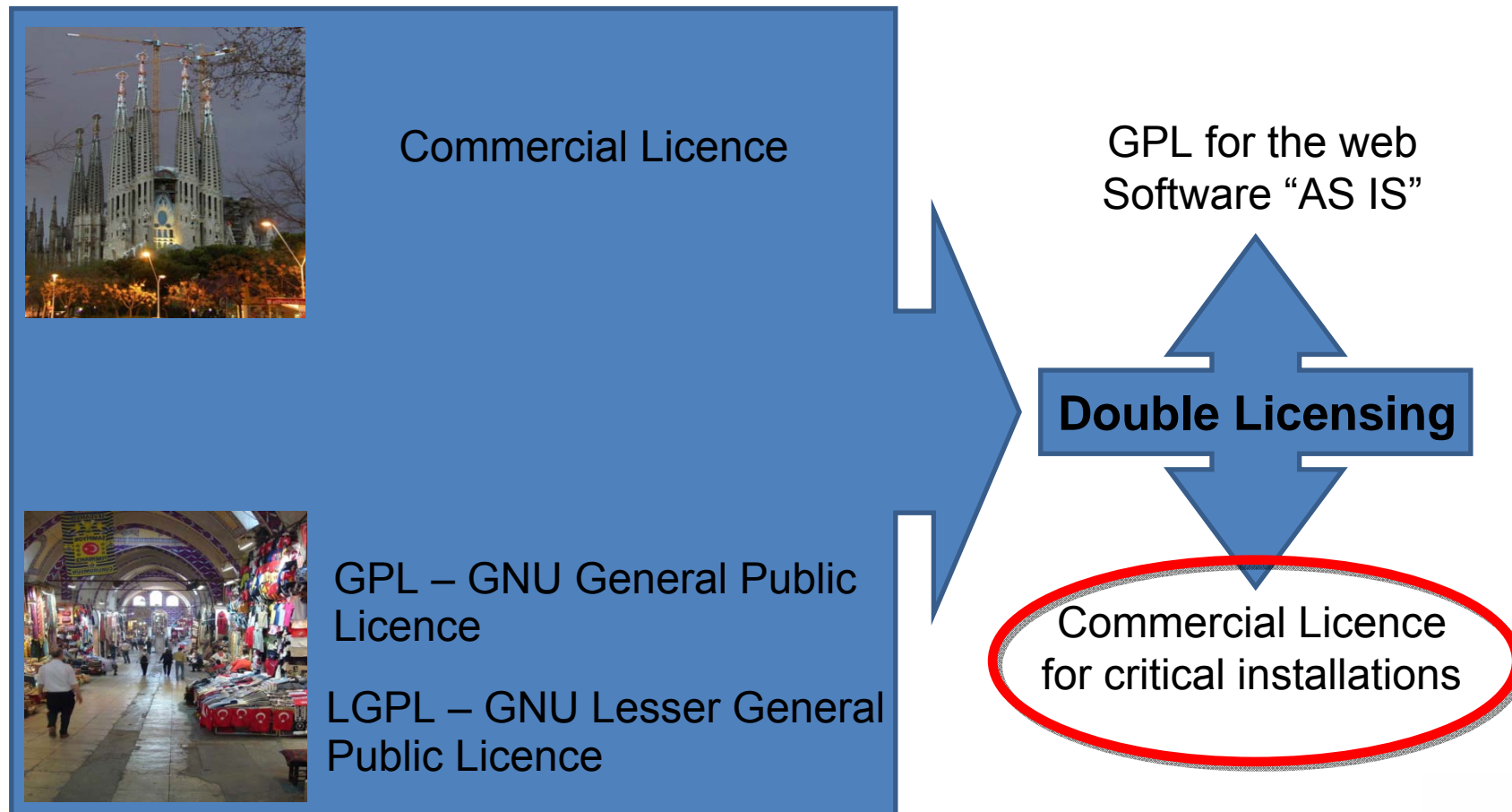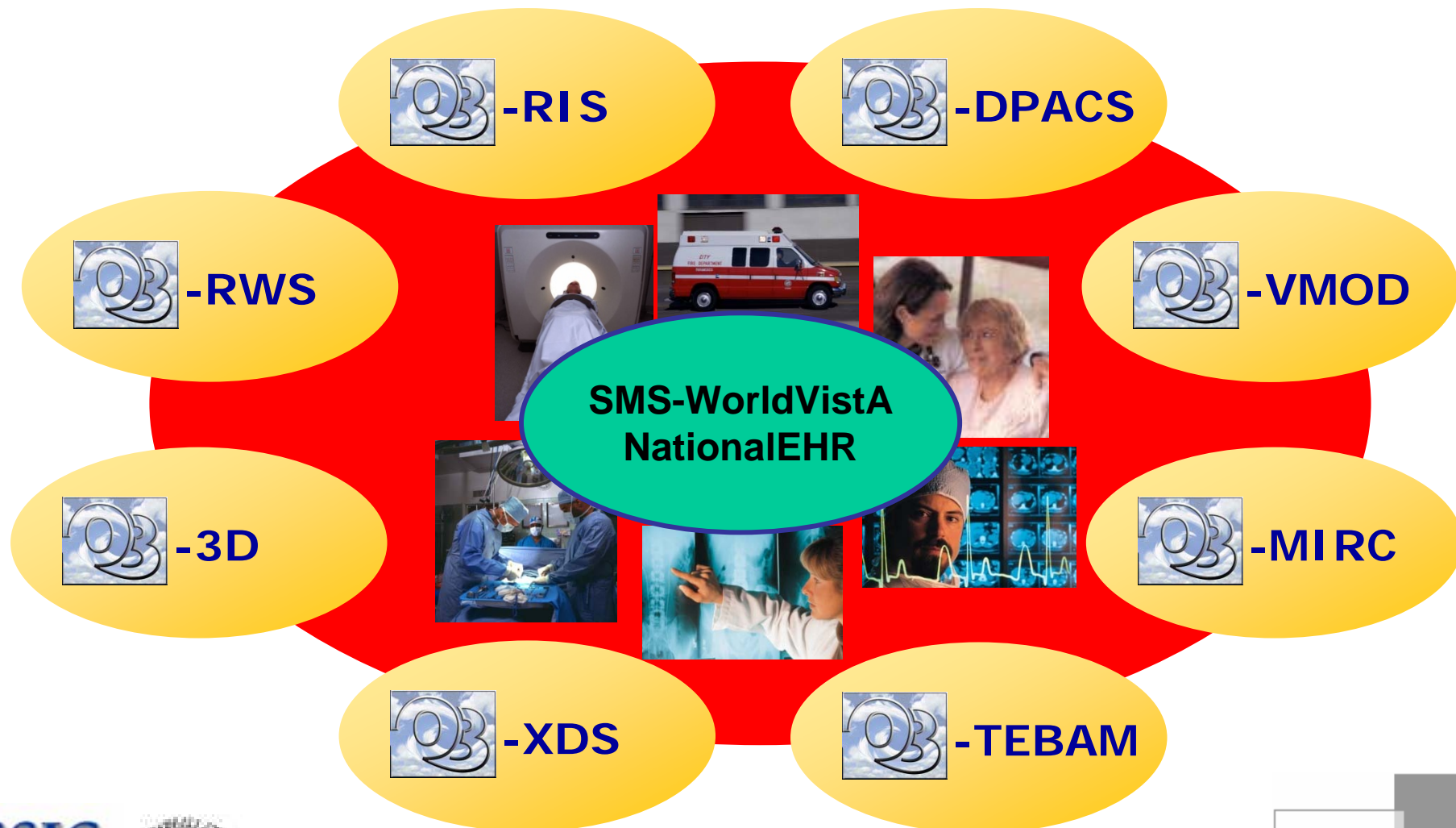- ➡ Very important role of the users!

O3 Open Source Approach

O3-Consortium implements both approaches:

- A well trained core team that has the complete know-how and management of the project
- A wide community of users and developers

O3 Licences approach

➡ The same approach (cathedral/bazaar) is used for the licences!

Commercial Licence

GPL – GNU General Public Licence

LGPL – GNU Lesser General Public Licence

GPL for the web Software "AS IS"

Double Licensing

Commercial Licence for critical installations

SSIC HECE

SMS-WorldVistA
NationalEHR

O3-RIS
O3-DPACS
O3-RWS
O3-VMOD
O3-3D
O3-MIRC
O3-XDS
O3-TEBAM

Software Distribution

➡️ **On SourceForge.net**

➡️ **On www.O3Consortium.eu**

   ◆ for registered users

   ◆ with web-based free help service

   ◆ with O3-AID free 26 facilities for third-world countries

➡️ **On DVD**

   ◆ under service agreement

O3 Services

- ➡️ **Direct to a user (single site, cluster, or ASP)**
  - ◆ Full service (1-2-3 levels) 7/7-24/24
  - ◆ Usually remotely (through a VPN)
  - ◆ Can include management

- ➡️ **Indirect to a Service Provider**
  - ◆ Level 3 service
  - ◆ Courses for training 1-2 levels services

O3 Consortium: the future

- O3 Enterprise is a Spinoff of the University of Trieste with the participation of
  - O3 Consortium core team
  - University of Trieste
  - Enterprises
- With this new object the O3-Consortium should create a new collaboration model for the healthcare.
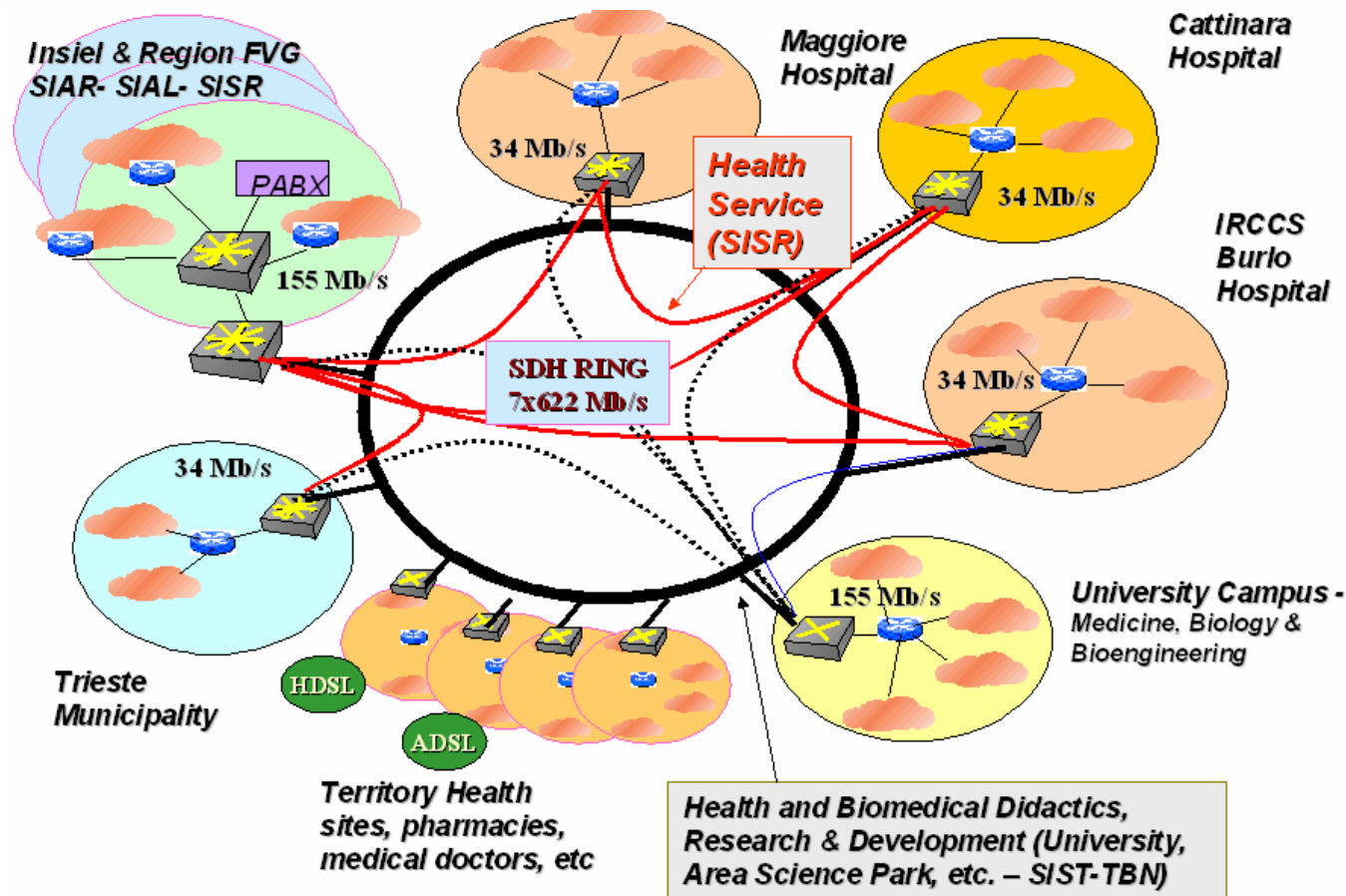 - Close and powerful collaboration between all the actors involved in healthcare delivery and management!
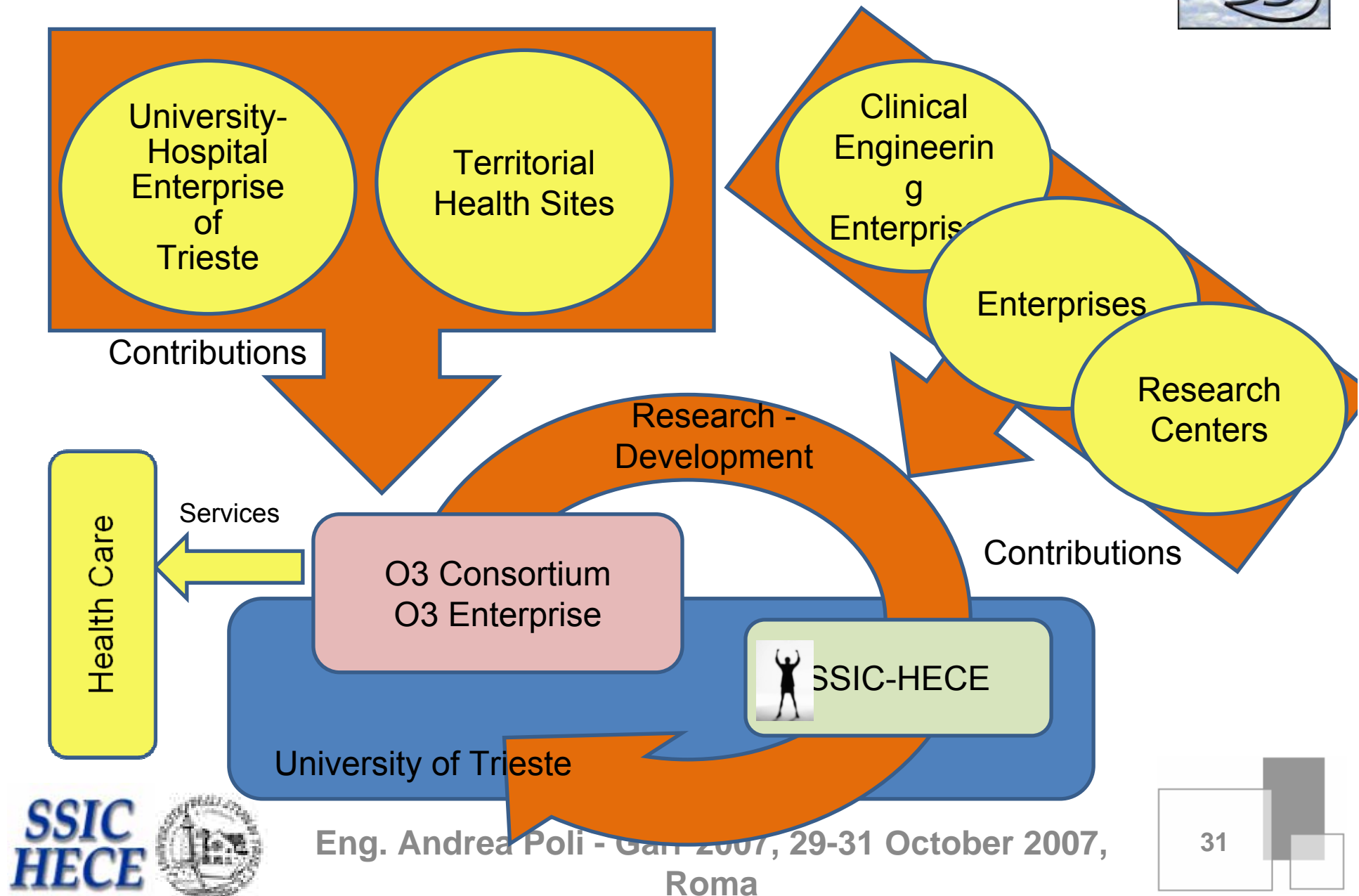
New model for Healthcare

➡️ Trieste, the city of Science, is a very good place for pushing this model:

◆ Clinical Engineering Education (SSIC-HECE)

◆ Biggest Clinical Engineering Services Enterprise

◆ Very good Clinical Engineering Service in the Hospitals

◆ Big Research Centers

➡️ All together interconnected by a high speed and secure network:

The new model – solutions development

University-Hospital Enterprise of Trieste

Territorial Health Sites

Clinical Engineering Enterprise

Enterprises

Research Centers

Contributions

Services

Research - Development

Contributions

Health Care

O3 Consortium
O3 Enterprise

SSIC-HECE

University of Trieste

Thank you for your attention

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