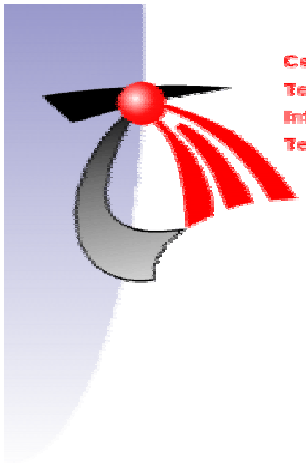

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THE INTERNET NEXT GENERATION PROJECT

PRESENTATION TO THE BOARD OF THE CTIT

8-3-1999

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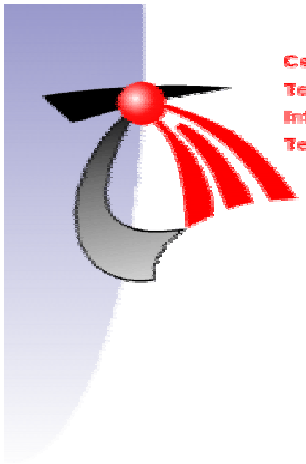

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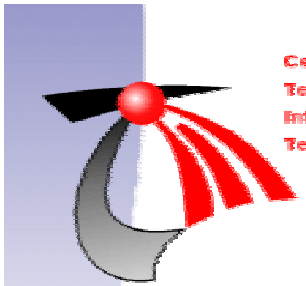
KEY FIGURES

START: 1-1-1999
DURATION: 4 YEARS

PARTNERS:

- CTIT
- TELEMATICS INSTITUTE - CENTRAL ORGANIZATION
- ERICSSON BUSINESS MOBILE NETWORKS
- ERICSSON TELECOMMUNICATIONS
- KPN RESEARCH

- COSTS PER YEAR: 2 MEURO (CTIT: 1 MEURO)



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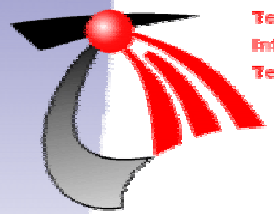
PROJECT GOALS

- **INCREASE DUTCH CONTRIBUTION TO THE INTERNATIONAL DEVELOPMENT OF NEW INTERNET TECHNOLOGIES**
  - **INTERNET-2, IETF, IRTF**

- **KNOWLEDGE CENTER WITHIN THE NETHERLANDS**
- **WEB SITE(S), TUTORIALS, ONLINE TRAINING MATERIAL, ANTC & ETB**



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RESEARCH SUBJECT

- **PROVISION OF QUALITY OF SERVICE IN THE INTERNET**

- **IN CORE NETWORKS**
- **IN ACCESS NETWORKS**

- **INTRODUCE ACCOUNTING**

- **IMPROVE MANAGEMENT ARCHITECTURE**

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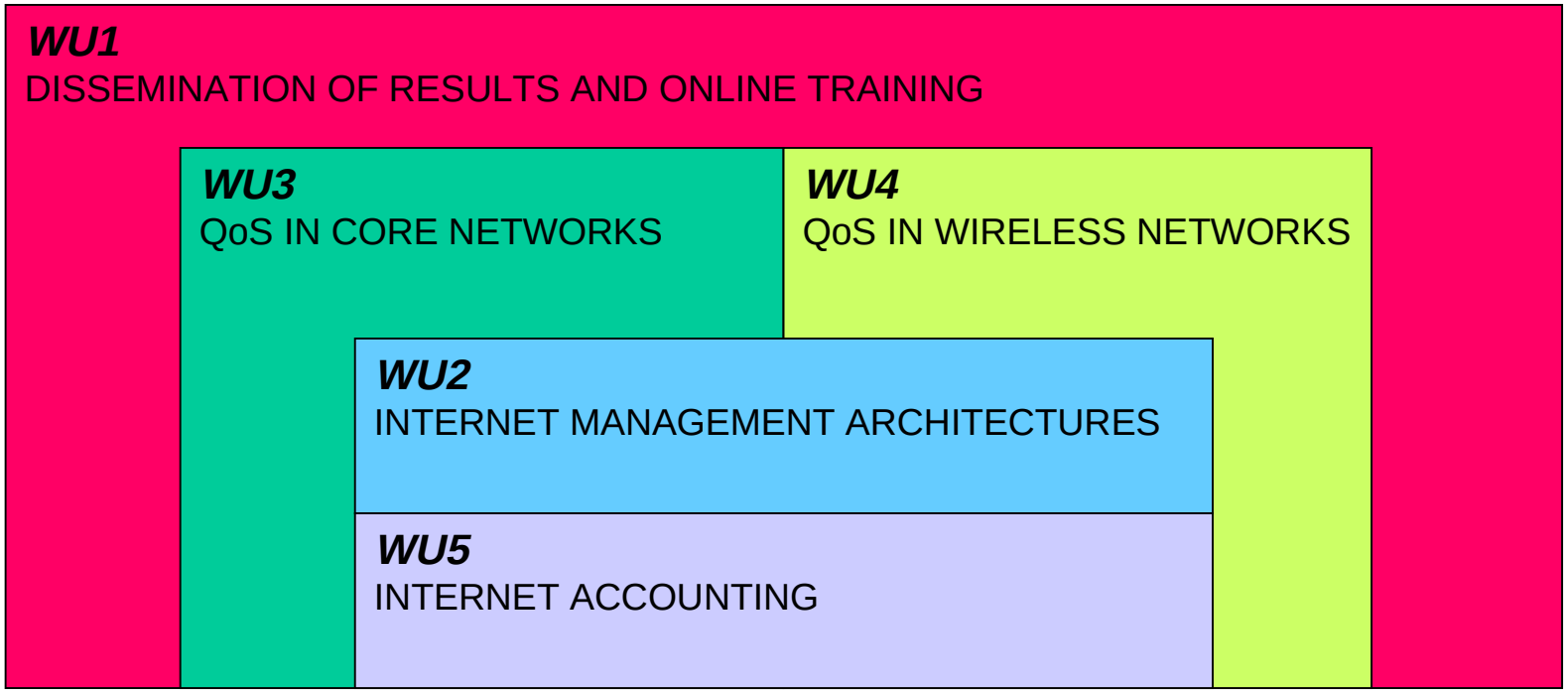
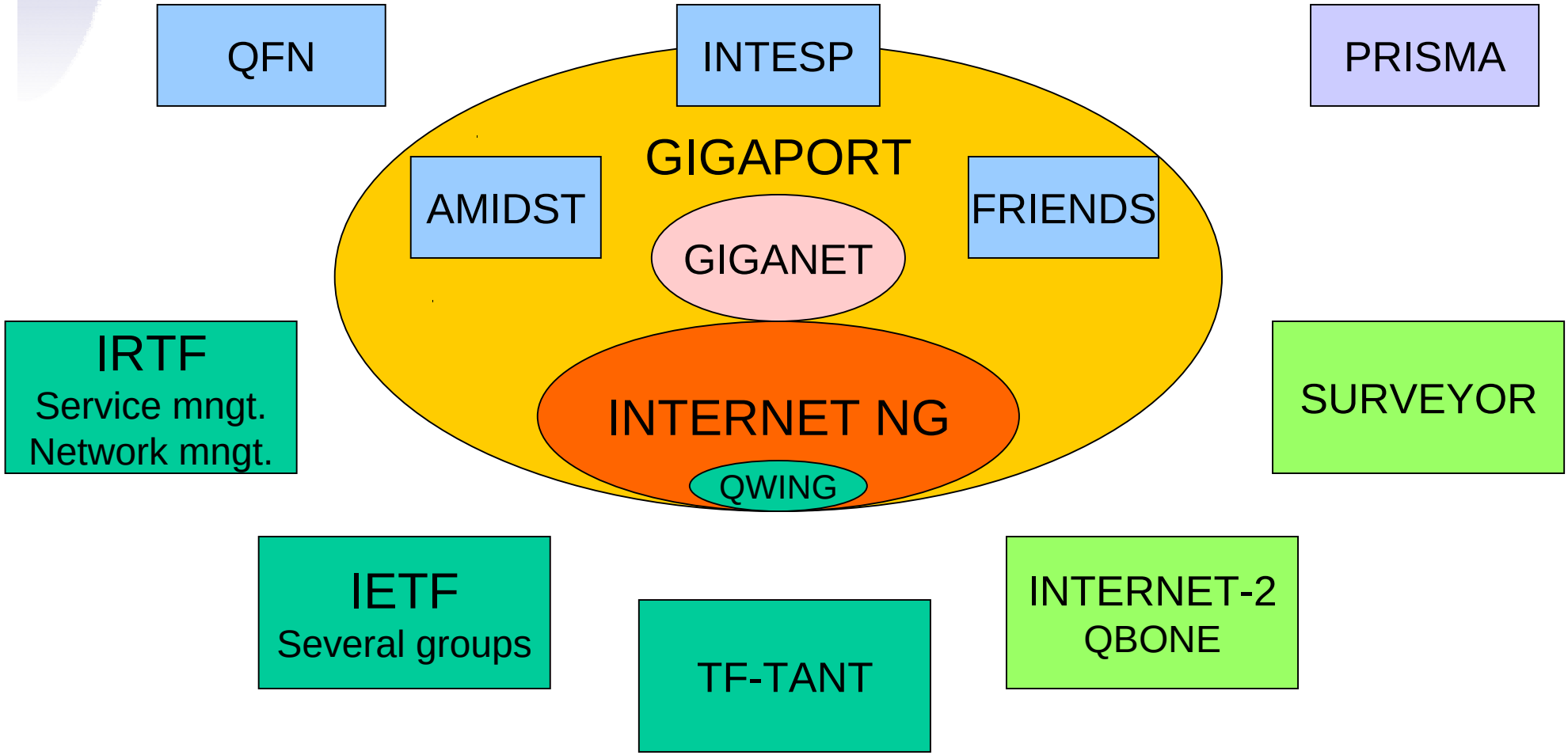
PROJECT STRUCTURE



RELATION BETWEEN PROJECTS



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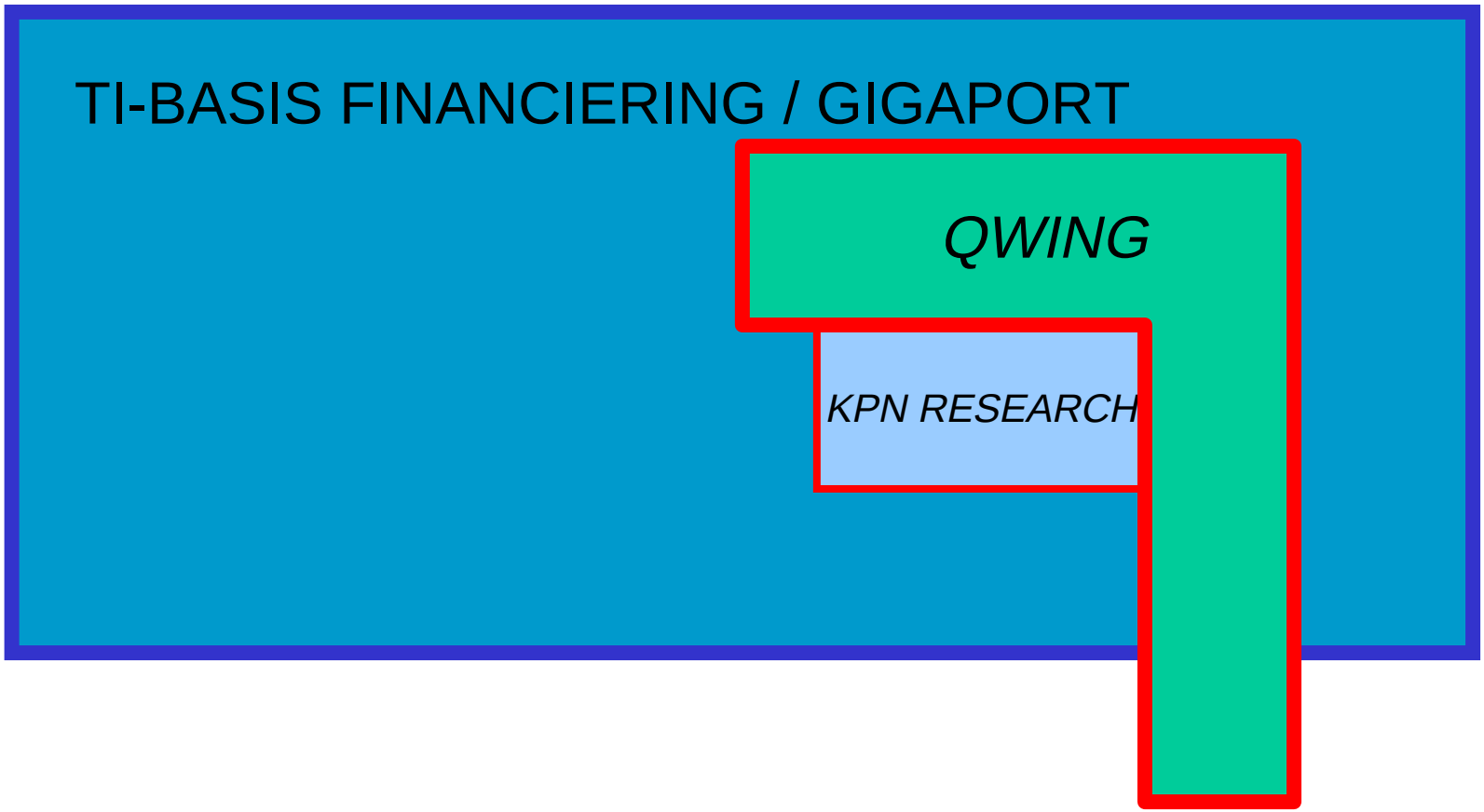
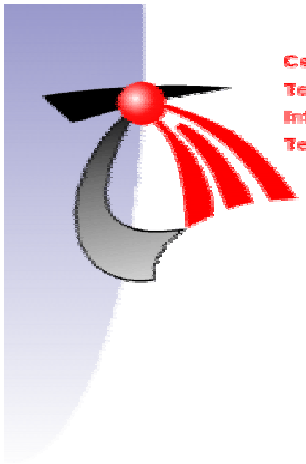
PROJECT FINANCE





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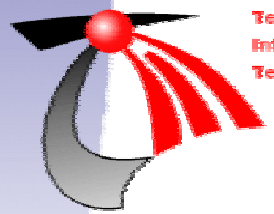
WORK UNIT 1

DISSEMINATION AND TRAINING



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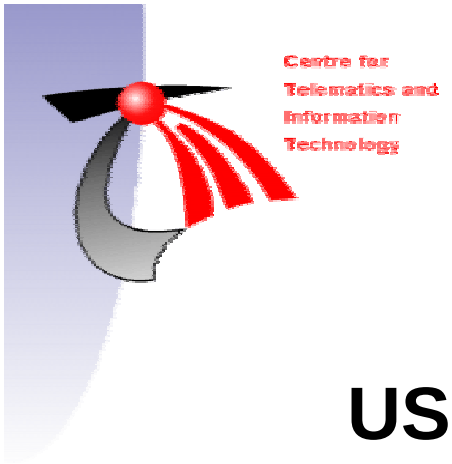
DELIVERABLES WU 1

WEB SITE WITH INTERNET MANAGEMENT INFORMATION

TUTORIALS ON:

- IPv6
- SNMPv3
- DISTRIBUTED MANAGEMENT
- INTSERV AND DIFFSERV
- MOBILE NETWORKING

TRAINING MODULE ON INTERNET MANAGEMENT



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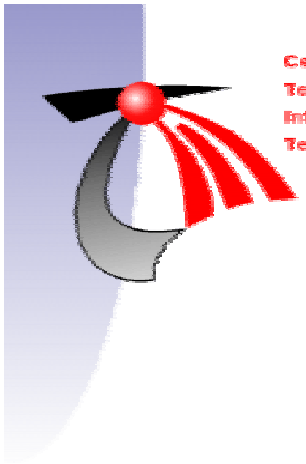
WU1 APPROACH

USE ADVANCED MODULES OF TGS:

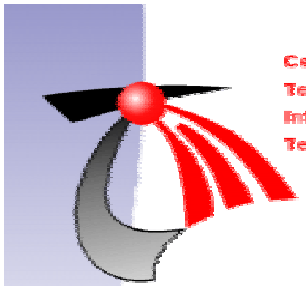
- INTSERV, DIFFSERV, IPv6
- MOBILE NETWORKS
- INTERNET MANAGEMENT PROTOCOLS

INVESTIGATE POSSIBLE EMBEDDING WITHIN EUNICE



WORK UNIT 2

NEW INTERNET MANAGEMENT ARCHITECTURES



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WU2 DELIVERABLES

31-10-1999: D2.1

HOW TO TRANSFER LARGE AMOUNTS OF MANAGEMENT DATA RELIABLY

31-12-1999: D2.2

INITIAL SERVICE MANAGEMENT ARCHITECTURE

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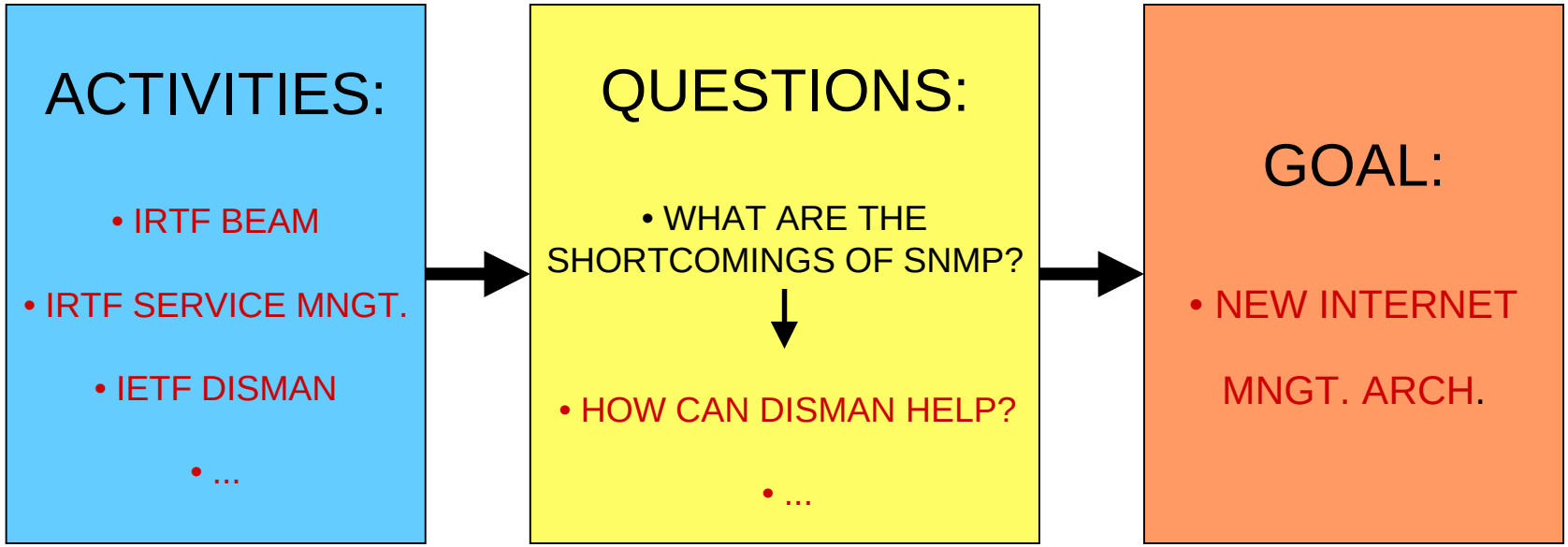
WU2 Approach



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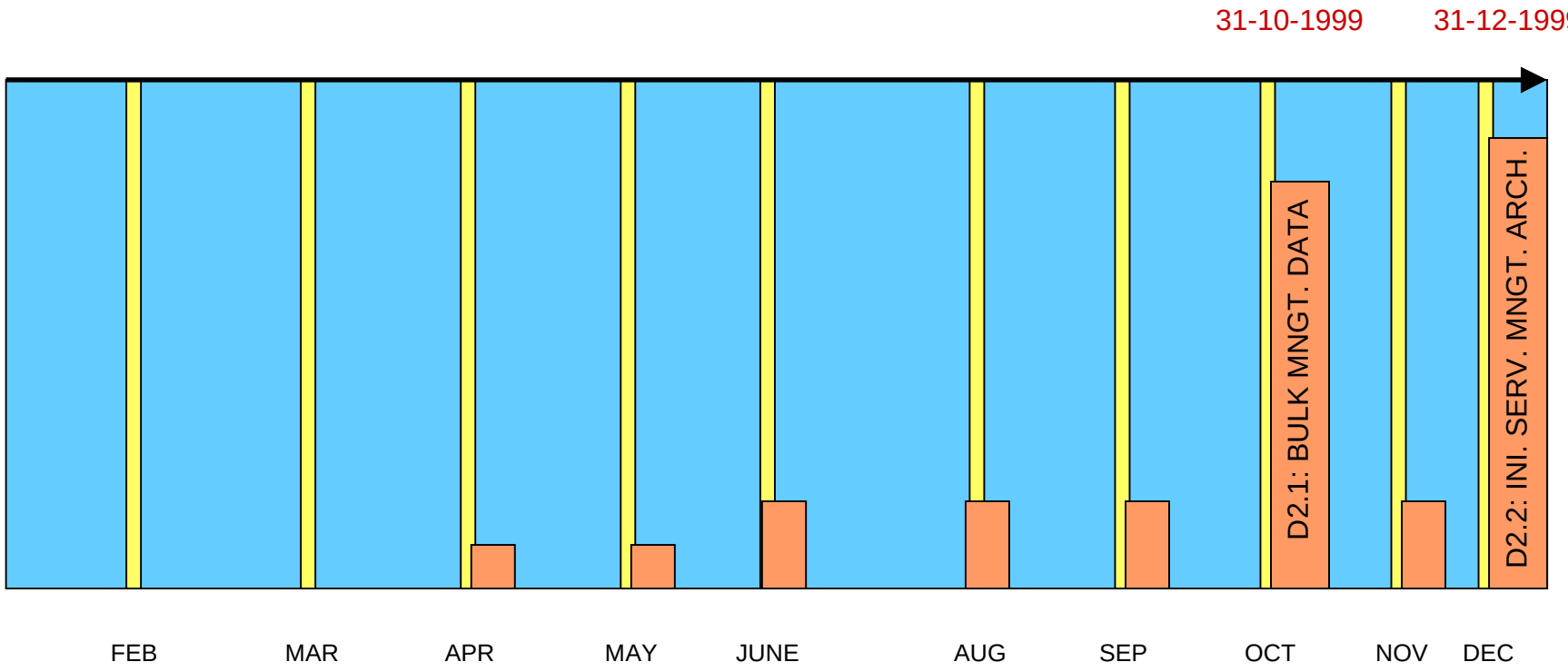
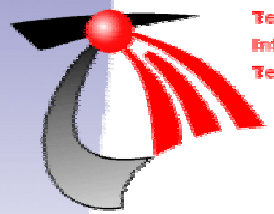
GOAL, QUESTIONS & ACTIVITIES





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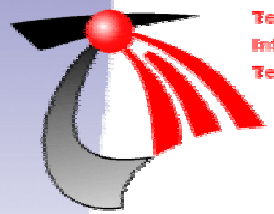
SHORTCOMINGS OF SNMP

- LIMITED SCALABILITY
- NO SPECIAL MEANS FOR INTER-OPERATOR MANAGEMENT
- DIFFICULT TO USE FOR END USERS (CNM)
- ...



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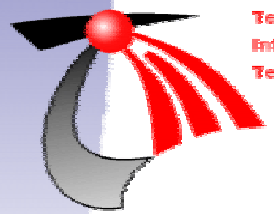
QUESTIONS

- WHAT ASPECTS OF EXISTING MANAGEMENT ARCHITECTURES MAY BE RELEVANT FOR THE FUTURE INTERNET MANAGEMENT ARCHITECTURE?
- WILL SNMP REMAIN IMPORTANT?
- CAN DISMAN HELP TO SOLVE THE SCALEABILITY PROBLEM? HOW?

- WHAT ARE THE MAIN PROBLEMS FOR INTER-OPERATOR MANAGEMENT
- CAN WE USE TMN IDEAS TO SOLVE INTER-OPERATOR MANAGEMENT? HOW?

- IS SNMP A GOOD SOLUTION TO TRANSFER LARGE AMOUNTS OF MANAGEMENT DATA? WHY (NOT)?
- CAN XML HELP TO TRANSFER LARGE AMOUNTS OF MANAGEMENT DATA?

- WHAT ARE THE MAIN PROBLEMS FOR CUSTOMER NETWORK MANAGEMENT?



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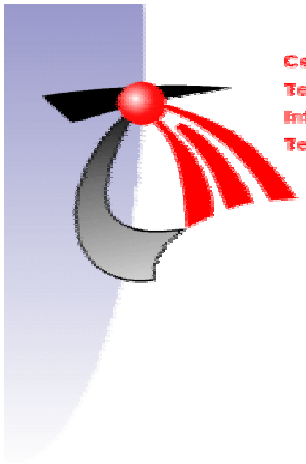
ACTIVITIES

- DEFINE TERMINOLGY (E.G. ELEMENT, DEVICE, NETWORK, PROTOCOL, APPLICATION, SERVICE, CUSTOMER & BUSINESS MANAGEMENT)
- STUDY STATE OF THE ART (E.G. SNMPv3, DISMAN, TMN, ISO, OMG/CORBA, W3C/XML)
- PARTICIPATE IN IRTF SERVICE MANAGEMENT GROUP
- PARTICIPATE IN IRTF NETWORK MANAGEMENT GROUP
- PARTICIPATE IN IETF DISMAN GROUP
- EXPERIMENT WITH DISMAN IMPLEMENTATIONS
- ...



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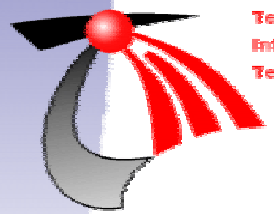
WORK UNIT 4

QoS OVER WIRELESS AND MOBILE ACCESS NETWORKS



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WU4 DELIVERABLES

- A FRAMEWORK FOR QoS SUPPORT FOR IP NETWORKS WITH WIRELESS AND MOBILE ACCESS NETWORKS
- A DESCRIPTION OF QoS SUPPORT BY WIRELESS NETWORKS
- A DESCRIPTION OF MOBILITY SUPPORT IN WIRELESS NETWORKS
- A DESCRIPTION OF RESOURCE RESERVATION AND ROUTING ALGORITHMS IN IP NETWORKS WITH MOBILITY
- WIRELESS TESTBED IN ANTC
- WIRELESS TESTBED AT ERICSSON

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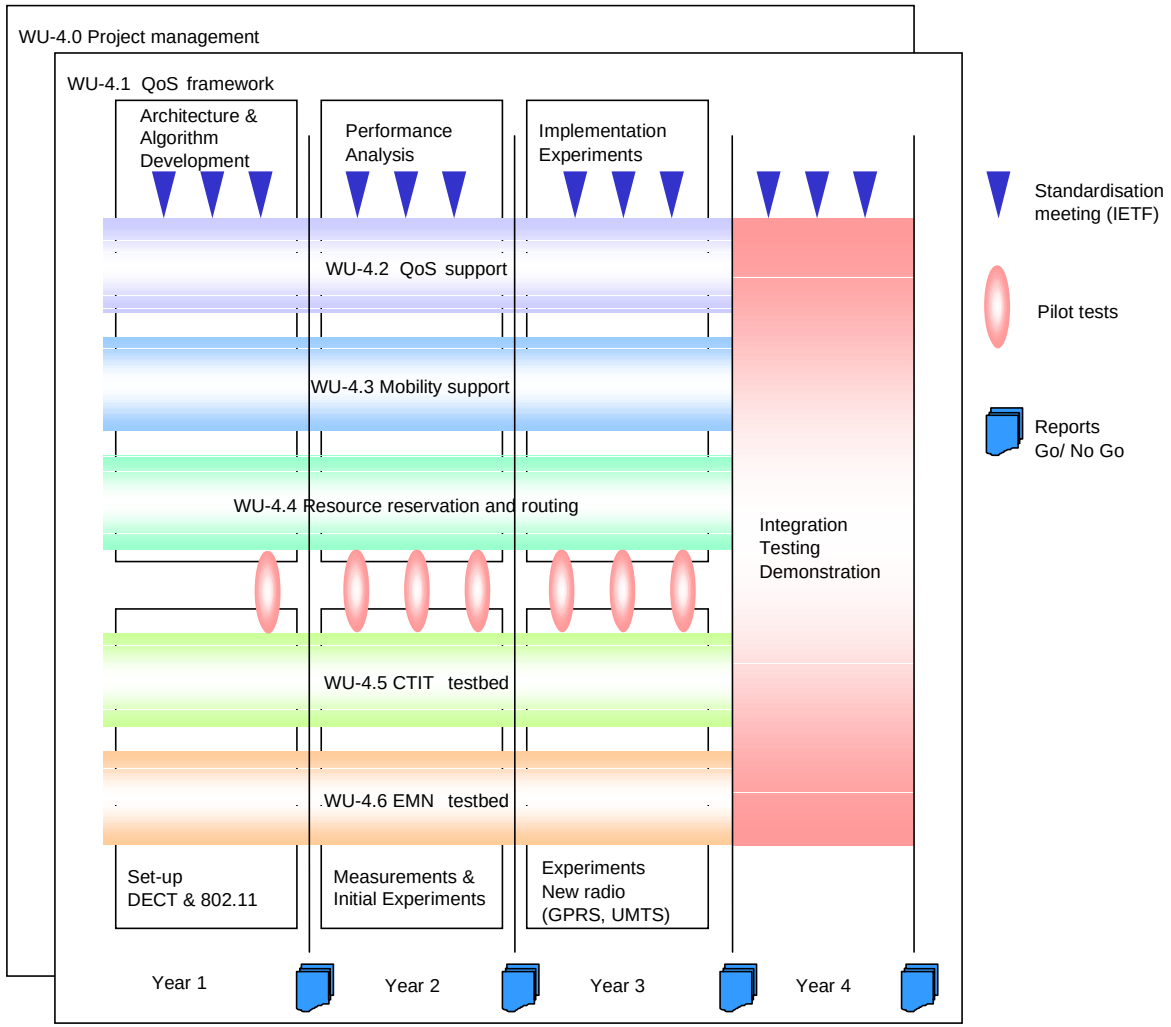
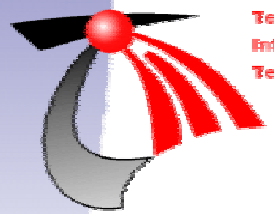
WU4 Global Planning





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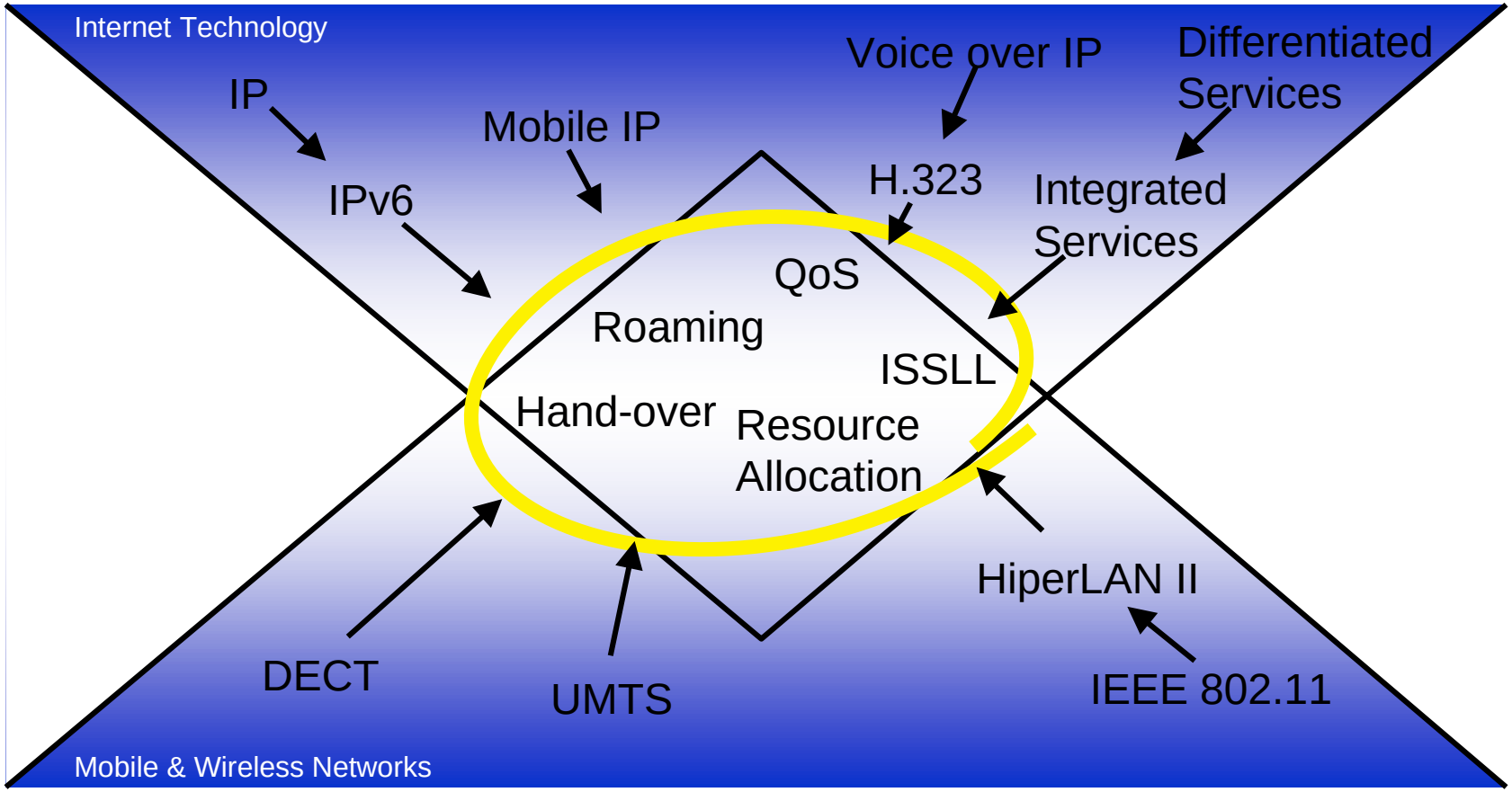
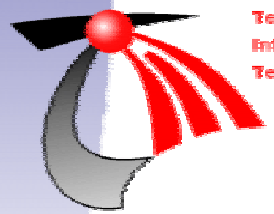
Key Issues

- Extension of Integrated Services and Differentiated Services Frameworks with the notion of QoS and mobility in wireless networks
- The use of mechanisms and protocols (e.g., RSVP) for service differentiation over wireless link layers
- The support of various wireless networks for QoS requirements and ability to differentiate between QoS classes
- Location management and handover algorithms to support real-time IP services in wireless networks
- Combined resource reservation and routing for high network efficiency, QoS support, and mobility support

Relevant Technologies





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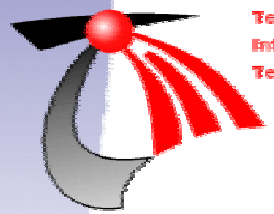
ACTIVITIES

- Framework development
- Evaluation and comparison of DECT, IEEE 802.11, HiperLAN II, and UMTS (W-CDMA / TD-CDMA)
- Design of schemes for QoS (re-)negatiation, admission control, resource allocation, and scheduling for a wireless subnetwork
- Design of schemes for location management and hand-over suitable for real-time services on wireless networks
- Design of schemes for per flow reservation in DiffServ domains with reservation for aggregated traffic
- Design of schemes for admission control and resource reservation in the presence of mobility, and optimization of routing



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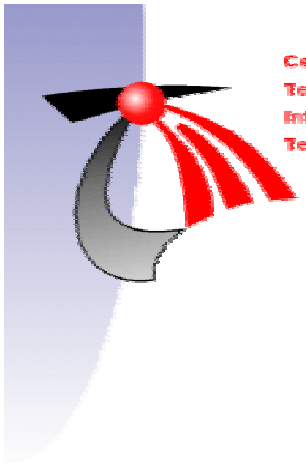
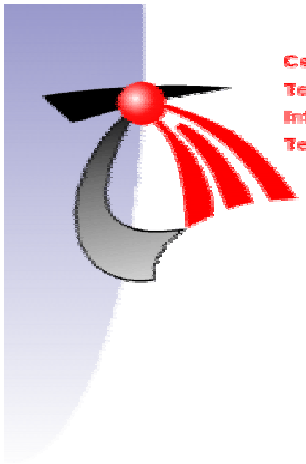
ACTIVITIES (CONT'D)

- ANTC Testbed setup using existing IEEE 802.11 equipment
- Modification of DECT hardware and software for use in a IP environment
- EMN Testbed setup using existing IEEE 802.11 equipment, and modified DECT equipment
- Measurement and modeling of IP level performance of DECT and IEEE 802.11
- Experiments on (IP level) performance requirements and traffic load of mobile / wireless applications
- Initial performance analyses



WORK UNIT 5

INTERNET ACCOUNTING



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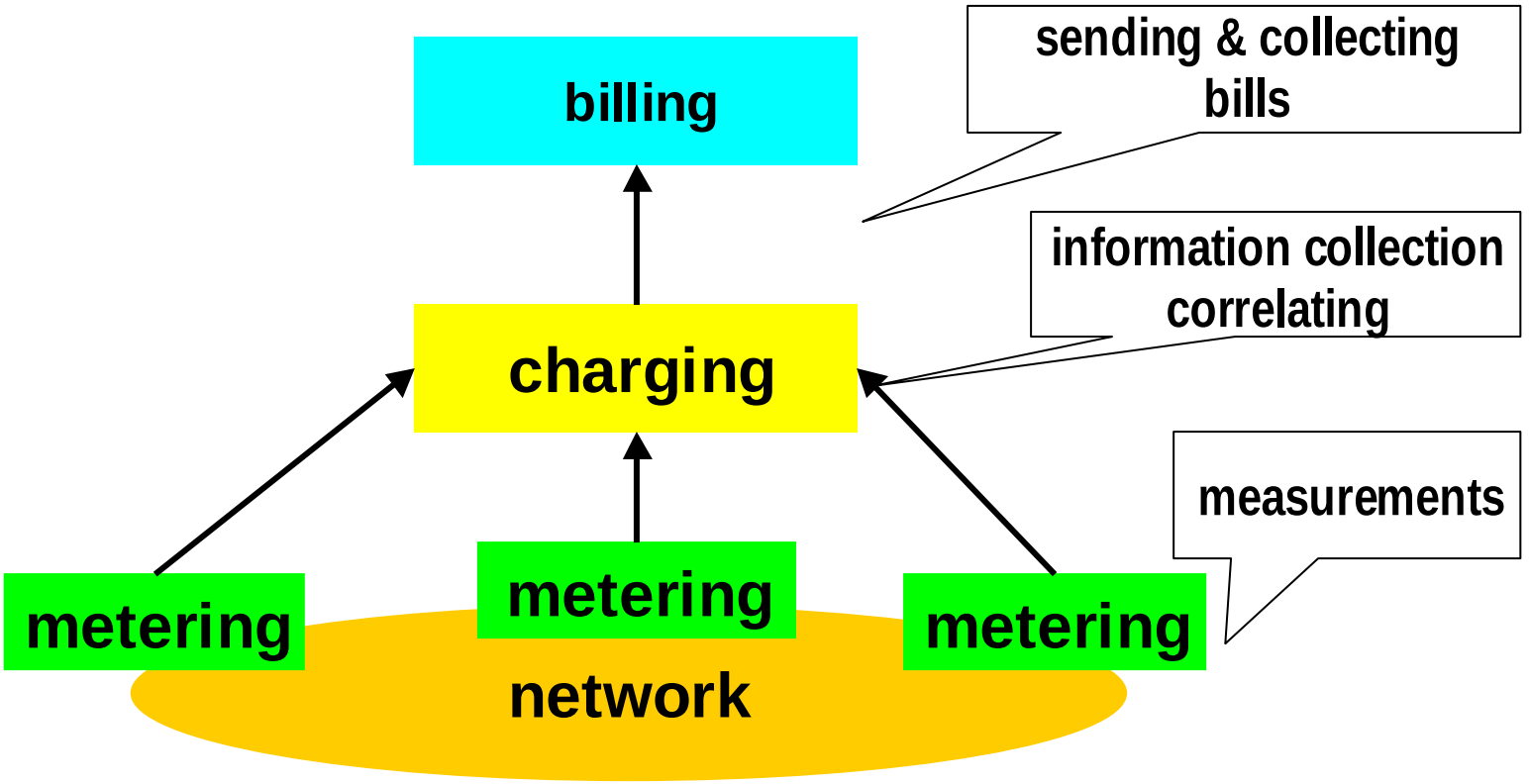
DELIVERABLES

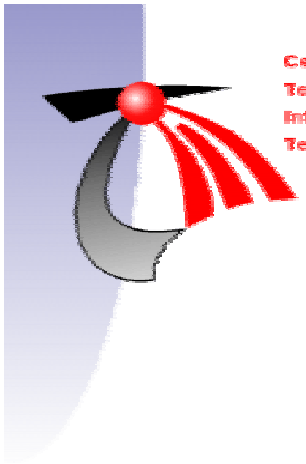
D5.1: STATE OF THE ART REPORT ON ACCOUNTING

D5.2: INITIAL INTERNET ACCOUNTING ARCHITECTURE

D 5.3: REPORT ON POSSIBLE TECHNIQUES FOR METERING

WHAT IS ACCOUNTING?





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WHY ACCOUNTING?

- **Internet NG $\Rightarrow$ QoS $\Rightarrow$ Accounting**
  - **a way to influence user-behavior**
- **it is the ultimate user-provider relation**
  - **allows for product differentiation**
- **access networks are scarse resources**
  - **providers want accounting !?**

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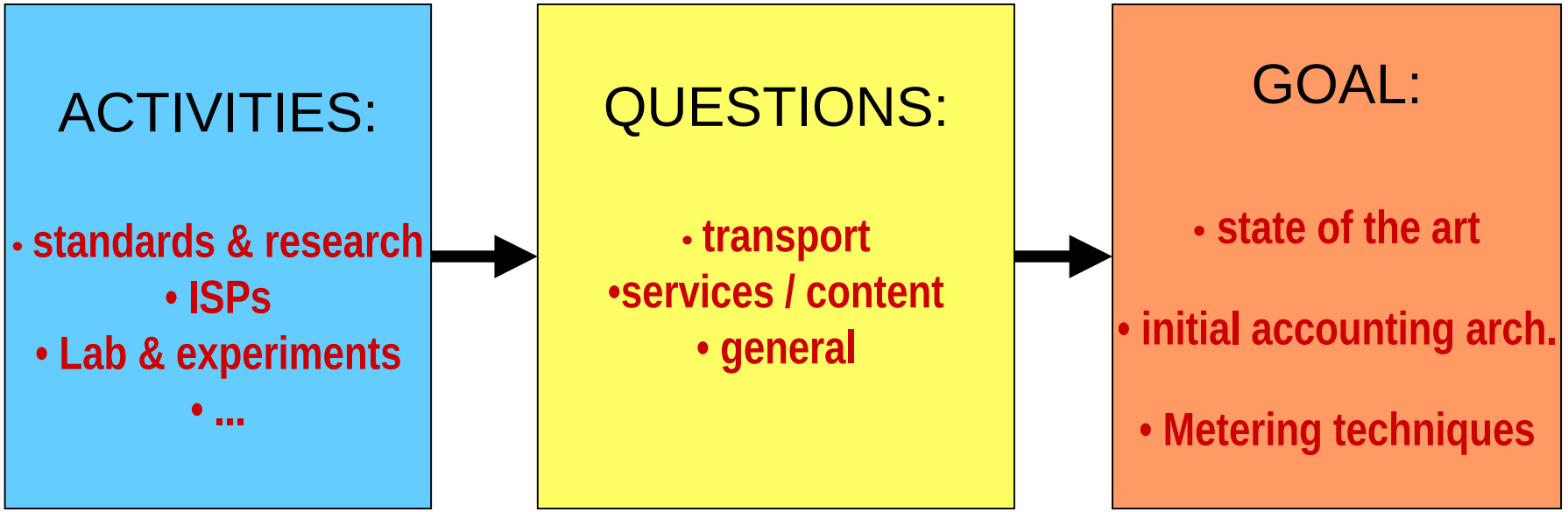
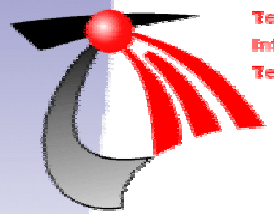
APPROACH





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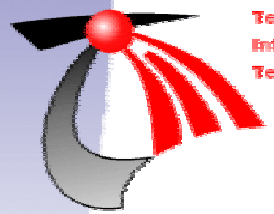
QUESTIONS - TRANSPORT

- Can you make a difference between local, national and international traffic
- Can you distinguish inter and intra traffic
- can you do accounting when e.g. retransmissions are involved
- what information is needed for accounting
- what is the influence of future developments
- ...



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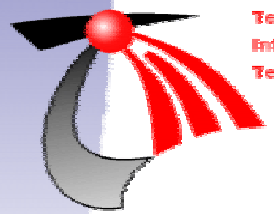
QUESTIONS - GENERAL

- **What's the difference between accounting in the 'old' and 'new' world**
- **who are involved in the accounting process and how will it be 'organized'**
- **what accounting information needs to be exchanged between ISPs/operators**
- **At what level(s) is accounting possible/needed (user or aggregates)**
- **...**



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ACTIVITIES

- State-of-the-art standards (IETF, TINA, IRTF)
- state-of-the-art research (publications, conferences)
- Interviews Internet Service Providers
- Accounting parameters used by ISPs.
- Influence of politics and regulations.
- Accounting lab, prototypes and experiments.
- Insight in Traffic Flows.
- Study new technologies and equipment (e.g. Mobility, DIFFSERV, INTSERV).
- Homepage.

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SOURCES FOR STATE OF THE ART

Standards

- IETF:
  - ATM accounting
  - RTFM
  - AAA
  - NASREQ
- TINA
- Eurescom
- ETSI
- ...

Projects

- ACTS:
  - CA$HMAN
  - CANCAN

Reports & products

- Bellcore
- ...
- Cisco
- ...