



# A New Approach to Quality of Service Management in Traffic Engineering Capable Networks

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## Outlines

- ✓ Quality of Service (QoS) in New Generation Networks (NGN)
  - Scenario
  - Operators' difficulties
- ✓ Trends of research
  - SOA
  - SONA, AON (Cisco)
  - Autonomic networking (IBM)
- ✓ The DiffServ-TE technology
- ✓ The approach adopted
  - Preliminary study
  - Targets of the research

# QoS in New Generation Networks

## ✓ Scenario

- Voice, video and data over a common IP delivery layer
- Quality performances should be comparable to traditional services
- New technologies for flow differentiation and traffic engineering

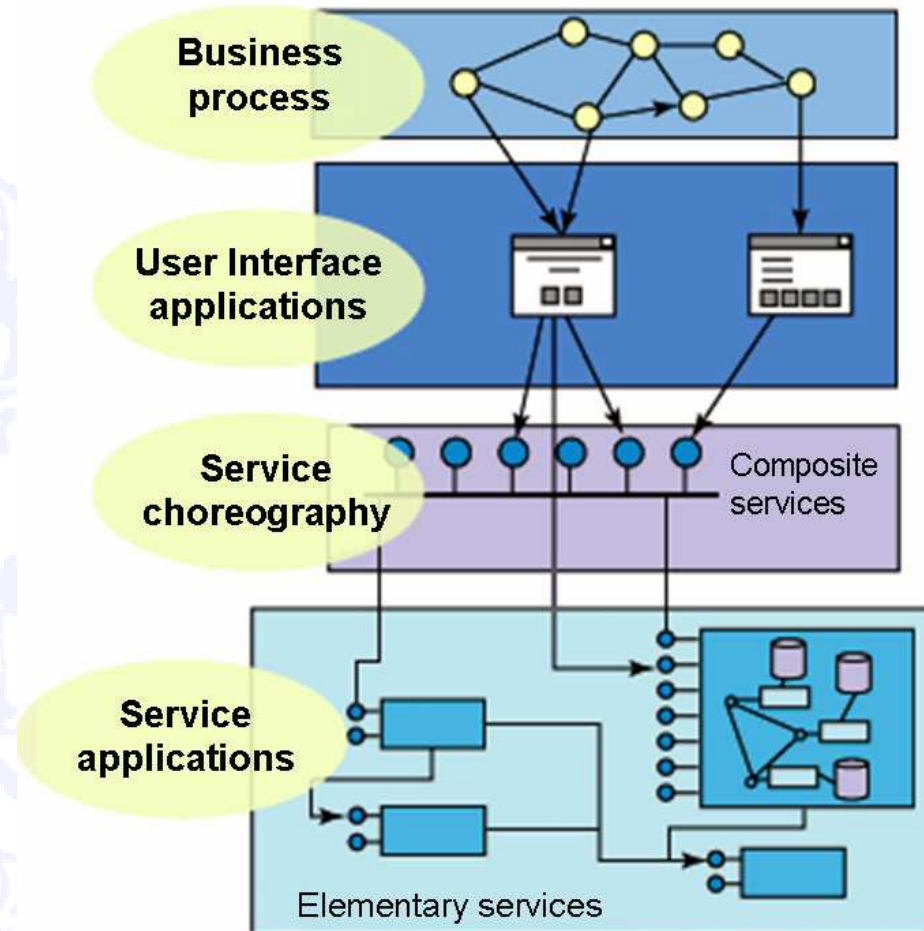
## ✓ Operators' difficulties

- Service reliability
- Best traffic mapping (max performance, min costs)
- Short-time user-customized services creation
- Definition of management policies at various detail levels

## Trends of the research (1/2)

- ✓ Service Oriented Architecture (SOA)

- “SOA is an architectural paradigm for matching needs and capabilities that may be under disparate domains of ownership”  
(OASIS definition)



## Trends of the research (2/2)

- ✓ The Cisco Service Oriented Network Architecture (SONA)
  - It adopts an architectural approach to connecting network-based services with applications
- ✓ The Cisco Application-Oriented Networking (AON)
  - Intelligent message routing aimed to reach the QoS requested by applications
- ✓ Autonomic Networking (IBM)
  - Self-managing networks

## SOA fundamentals (1/2)

### ✓ SOA key-principles

- Decomposition in blocks named *services*
  - ❖ Independent
  - ❖ Weakly coupled
  - ❖ Stateless
  - ❖ Self-contained
  - ❖ Reusable
  
- Composition of complex services with an interconnection of elementary and independent blocks

## SOA fundamentals (2/2)

### ✓ Advantages

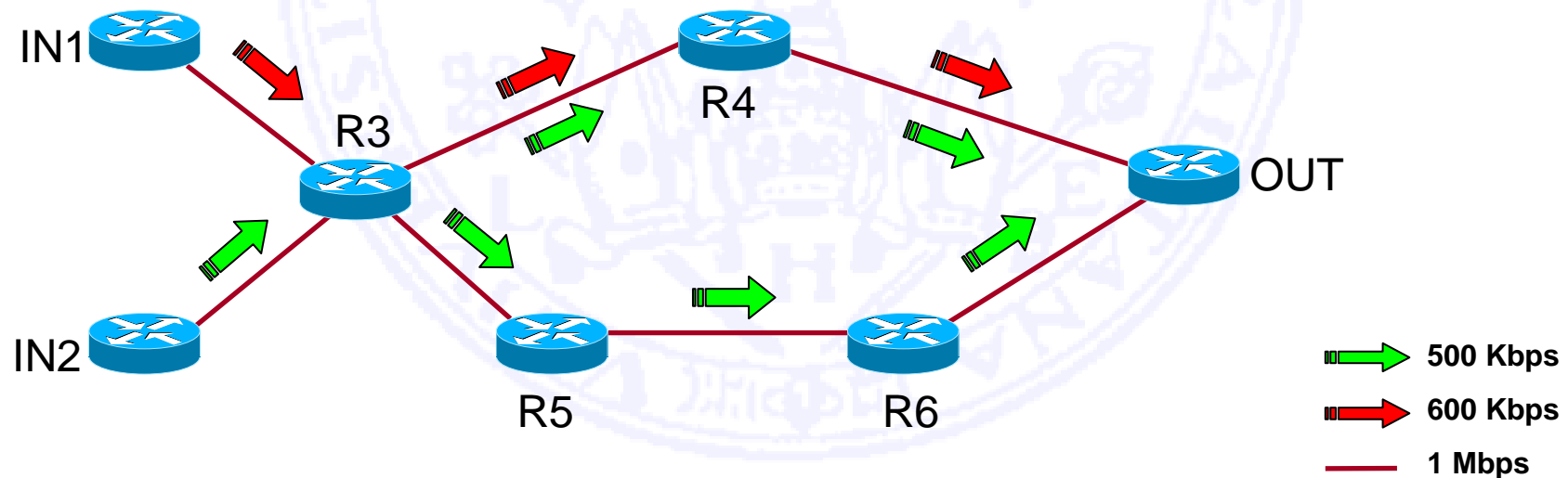
- Reusability of services
- Abstraction and encapsulation
- Composability
- Loose coupling

### ✓ Disadvantages

- New design of the existent systems

## The DiffServ-TE technology (1/2)

- ✓ State-of-art of IP-core management networks
- ✓ Main features
  - Differentiation of various traffic typologies in flows
  - Per-flow routing





## The DiffServ-TE technology (2/2)

### ✓ Advantages

- Traffic Engineering, load balancing
- QoS guarantees according to Service Level Agreement (SLA)
- Better use of resources vs classical overprovisioning

### ✓ Disadvantages

- Increasing complexity of network management
- Reactivity to traffic changes
- Operator supervision

# SOA applied to DiffServ-TE

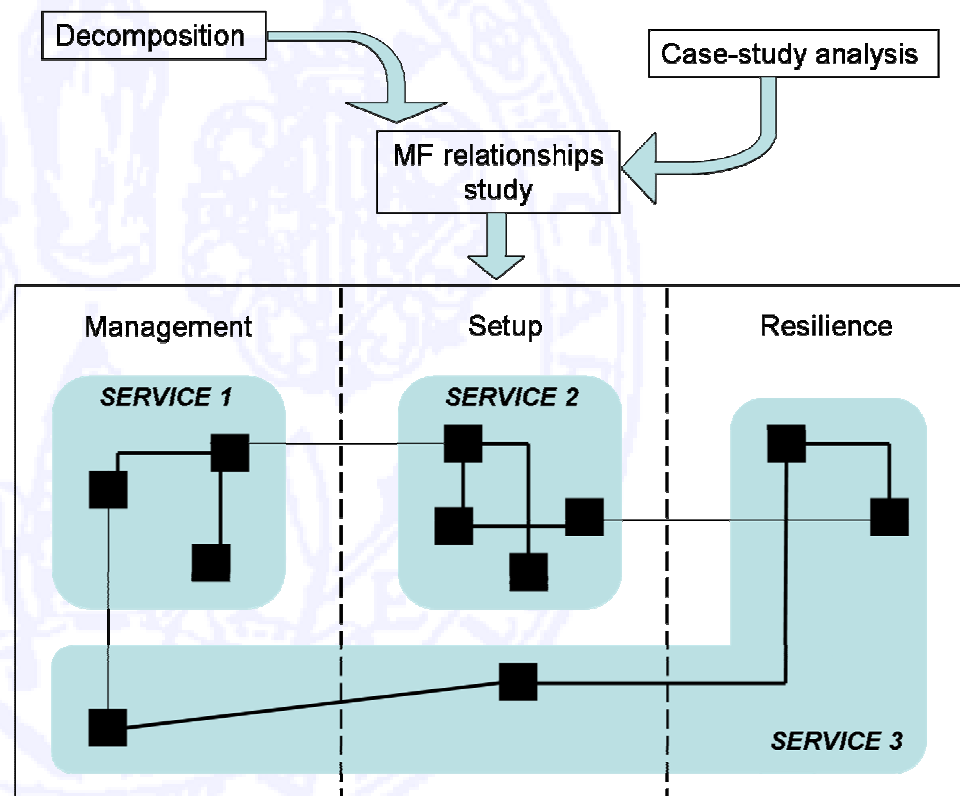
## ✓ Challenges

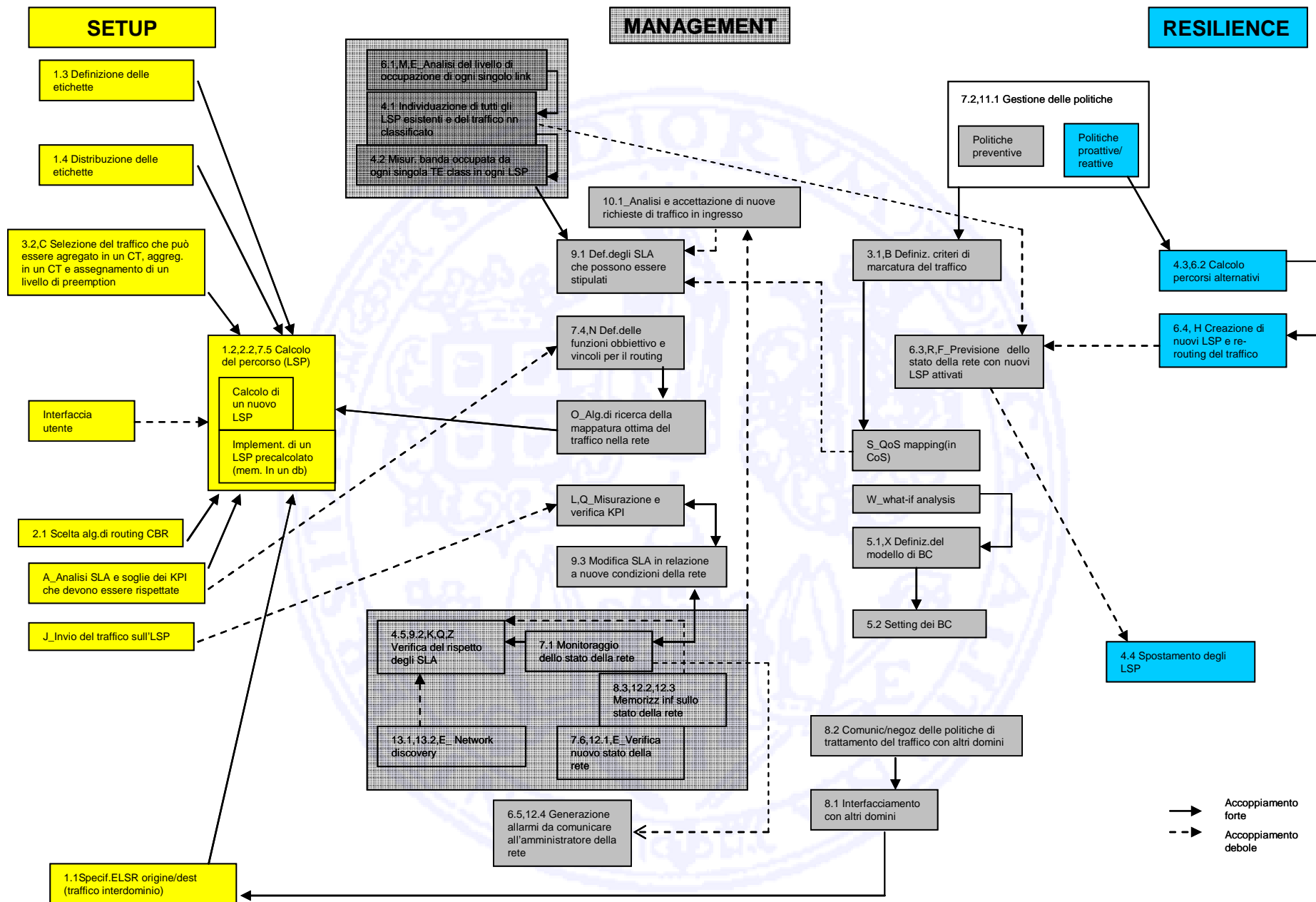
- System interoperability
- Adaptability to network changes
- Flexibility in complex and heterogeneous systems
- Services offered must refer to real services, not software

## The approach adopted

### ✓ Preliminary study

- Decomposition in Micro-functionalities (MF)
- Case-study analysis
- MF relationship study
- MF grouping in three areas
- Elementary service extraction





## The approach adopted

### ✓ Targets of the research

- Reach the best interoperability between heterogeneous systems
- Increase flexibility and easiness of network management
- Efficient SLA mapping over a distributed system such as a telecommunication network



Thank you for your attention!  
Questions?