



# Communication Networks II

## Multimedia Communications / QoS

### Specific Topics:

## Instant Messaging

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# Scope

<b>KN III (Mobile Networking), Distributed Multimedia Systems (MM I and MM II), Telecooperation II,III. ...; Embedded Systems</b>								
L5	<b>Applications</b>	<b>Terminal access</b>	<b>File access</b>	<b>E-mail</b>	<b>Web</b>	<b>Peer-to- Peer</b>	<b>Inst.-Msg.</b>	<b>IP-Tel.</b>
	<b>Application Layer (Anwendung)</b>							<b>SIP &amp; H.323</b>
L4	<b>Transport Layer (Transport)</b>	<b>Internet: UDP, TCP, SCTP</b>			<b>Netw. Transitions</b>	<b>Security</b>	<b>Addressing</b>	<b>Transport QoS - RTP</b>
L3	<b>Network Layer (Vermittlung)</b>	<b>Internet: IP</b>						<b>Network QoS</b>
L2	<b>Data Link Layer (Sicherung)</b>	<b>LAN, MAN High-Speed LAN</b>						
L1	<b>Physical Layer (Bitübertragung)</b>	<b>Queueing Theory &amp; Network Calculus</b>						
<b>Introduction</b>								
Legend:		<b>KN I</b>			<b>KN II</b>			



# Overview

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- 1. Basics, Principles and State of the Art**
- 2. Future Enhancements - Open Issues**



# 1. Basics, Principles and State of the Art

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## Instant Messaging (IM)

- **tries to feature real-time direct conversation**
  - comparable to SMS / pager services or person to person chat
  - using text messages
  - different from email
- **"instant" content sending and delivery**
  - immediate transport if possible
  - by "leaving" it for the receiver otherwise
- **usually coupled with presence mechanisms**

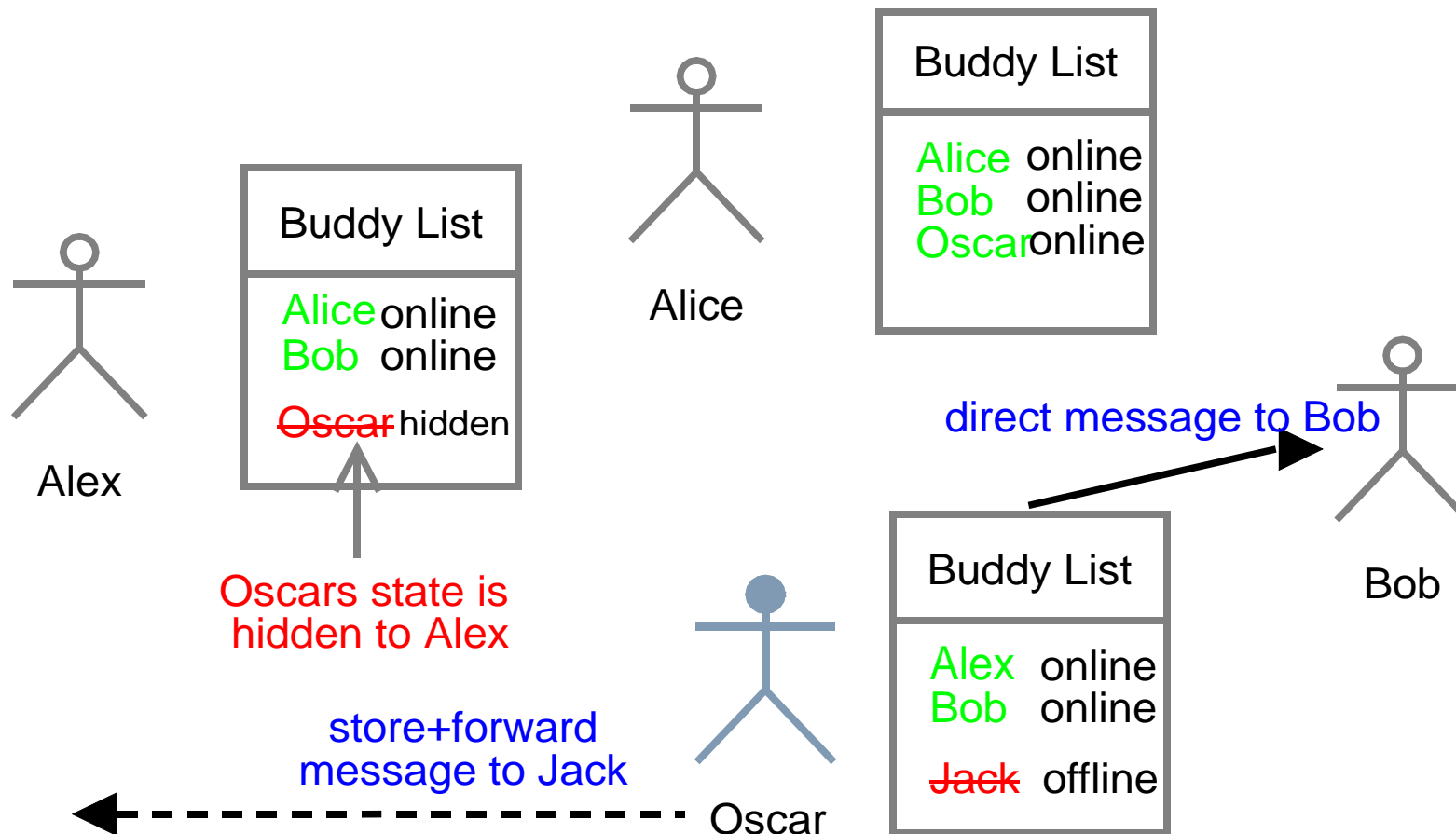
## Frequently enhanced with additional services like

- **buddy lists**
  - all users I want to communicate with
- **chat rooms (private/public)**
- **notification of e.g. email**
- **news ticker**
- **file transfer**



# Instant Messaging - User View

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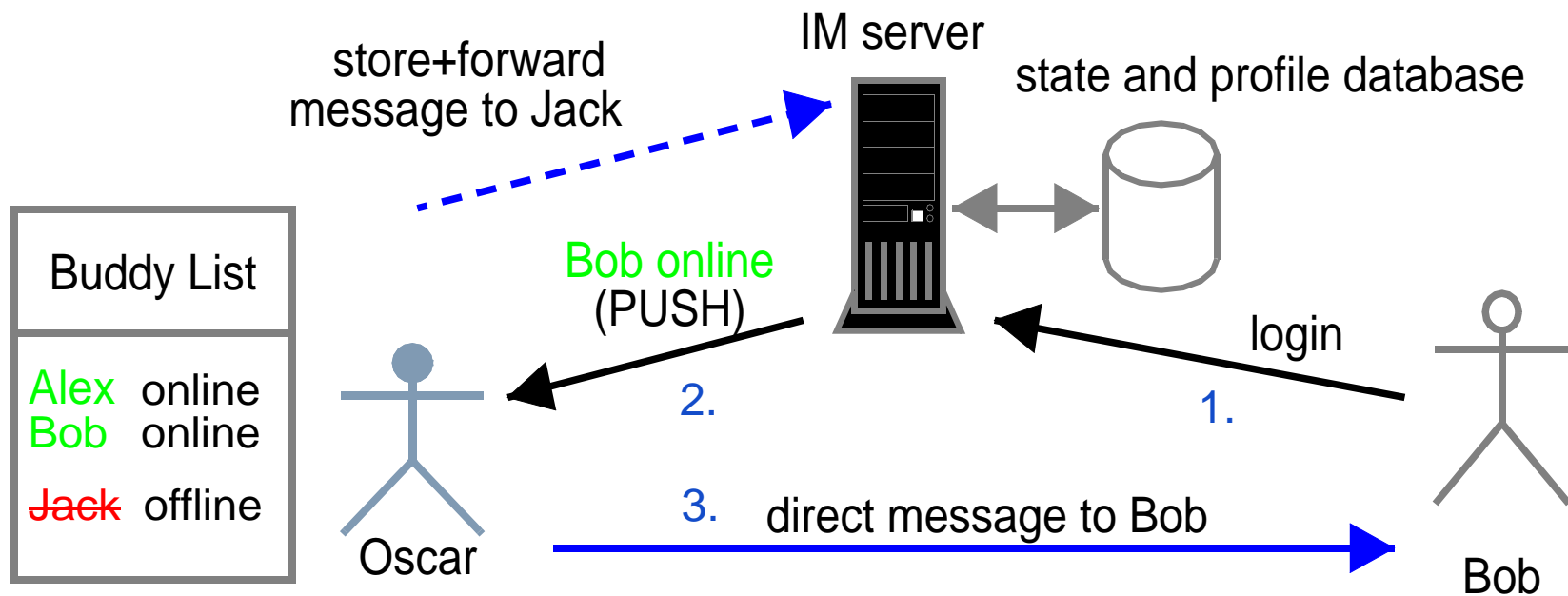
Oscars state is hidden to Alex

- let other people "see" my presence (if I do allow that)
- let me see the presence of other people
- reach available persons immediately or leave them a message



# Instant Messaging - System View

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## Communication protocol

- **client / server model combined with server push mode**
- **centralized databases allow to retrieve "profile / buddy list information"**
  - from whatever client somebody is currently using (e.g. PC at work, home,..)

## Message Transfer Alternatives

- **direct:** after learning partners point of presence from infrastructure
- **proxied:** through infrastructure (makes coping with firewalls easier)
- **store and forward**



# Programs and Products

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## Global Players

- **AOL**
  - AOL Proprietary Messenger
  - AOL Instant Messenger (AIM) Standalone
  - ICQ
- **Microsoft**
  - MSN Messenger (Netmeeting / H.323)
  - Windows Messenger (UPnP / SIP)
- **Yahoo! Messenger**
- **T-Online Messenger**

## Clients and protocols

- **proprietary and incompatible**

## Alternative approach

- **Jabber Software Foundation (XML, Open Protocol)**
  - various clients like Gabber, ...



## 2. Future Enhancements - Open Issues

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### privacy and data security

- encryption of data
- ensure that data will not be monitored / sold
- granting, managing and retracting permissions

### interoperable clients

- increasing number of polyglot clients caused by
  - competition, reverse engineering
  - ongoing modifications, enhancements

### access from multiple devices

- PC, wireless devices, PDA, IP phones

### scalability

- hundreds of
  - millions of users
  - billions of messages/notifications per day
- possible speed limits for the propagation of states in distributed systems

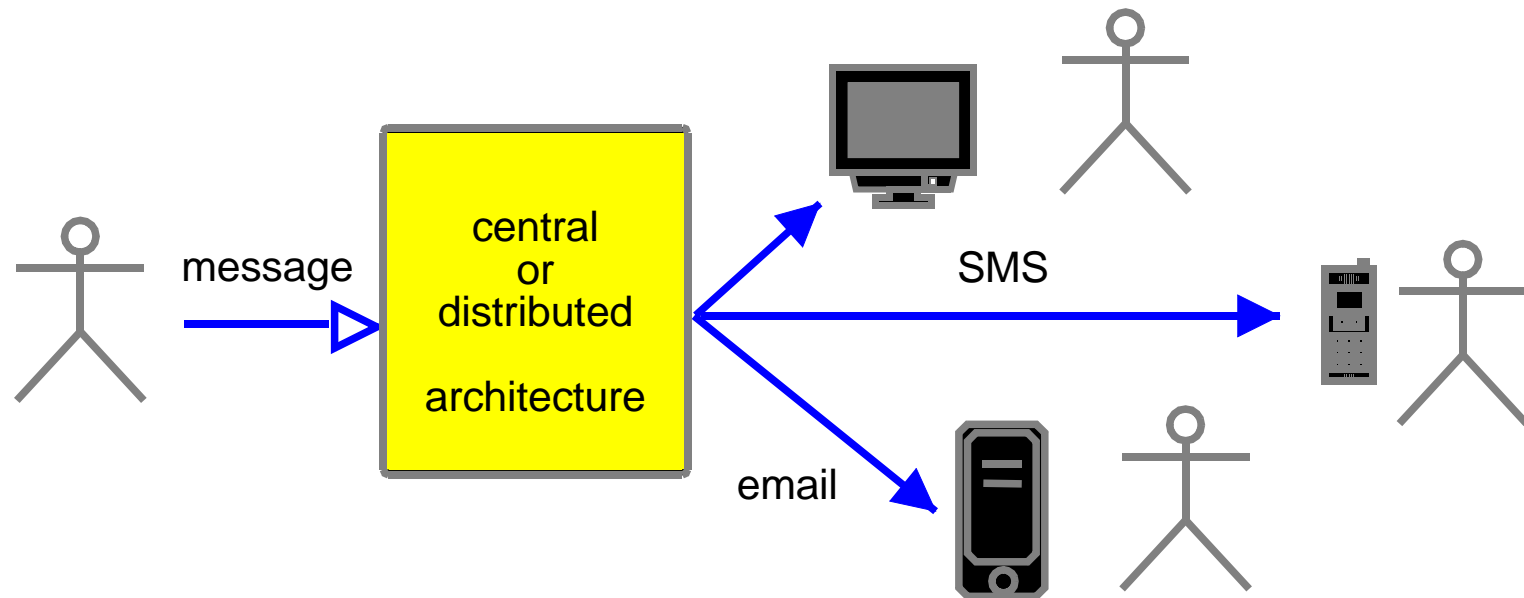
### Telephony integration

- many services require voice integration industry mandates





# Future Enhancements - Context Integration



## New Approaches

- **include location and context awareness**
  - where is the user
    - at the moment
    - in near future
  - what is the user doing
  - which are
    - the available and most suitable communication devices and media
- **use implicit and explicit states**
  - derive state from known attributes



# Instant Messaging with SIP

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## Use SIP infrastructure for Instant Messaging

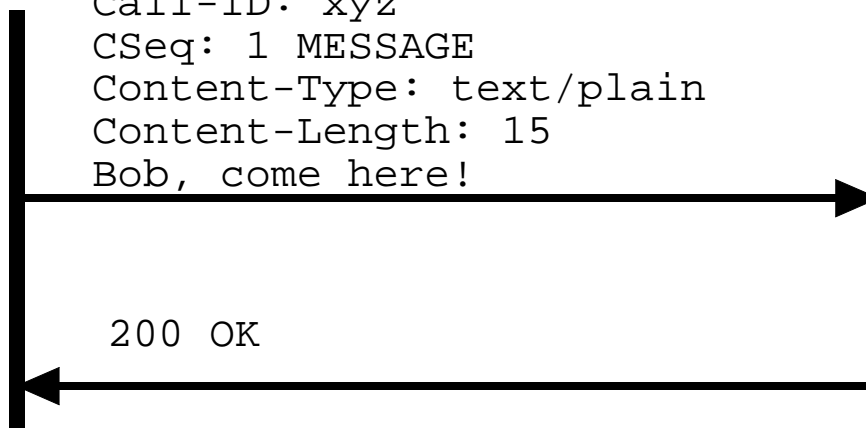
- provides signaling framework
- SIP
  - servers route messages
  - registrars provide means for addressing and locating users
  - covers some security aspects inherently already

## New aspects to SIP

- **Instant Messaging**
  - problem
    - possible congestion on SIP signaling path through large amount of SIP messages carrying user payload
  - solution:
    - to define new MESSAGE method which is sent direct to the target and not through SIP server
- **Presence**
  - use SIP event concept
    - SUBSCRIBE / NOTIFY
  - new event type “presence”

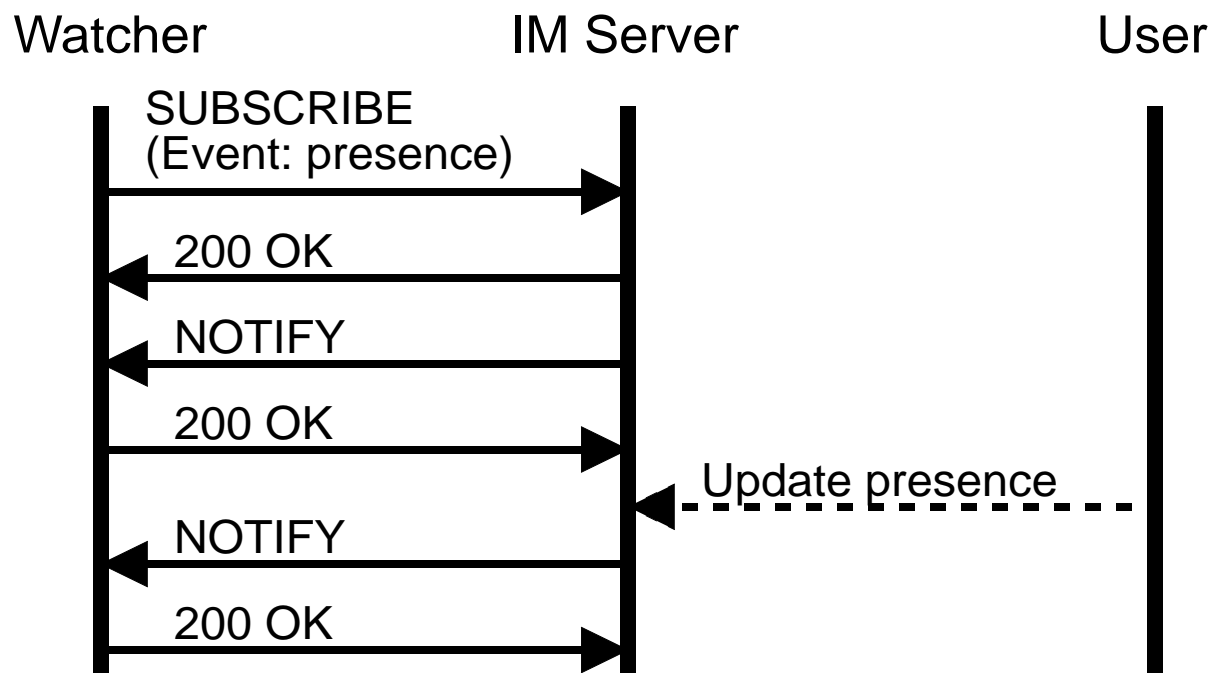


```
MESSAGE sip:Bob SIP/2.0
Via: SIP/2.0/TCP
proxy;branch=xxx
From: sip:Alice;tag=yyy
To: sip:Bob
Call-ID: xyz
CSeq: 1 MESSAGE
Content-Type: text/plain
Content-Length: 15
Bob, come here!
```



## SIP MESSAGE method for Instant Messaging

- **addressing uses SIP or IM URIs**
- **200 OK**
  - only indicates the message was accepted by the User Agent (UA)
- **payload transport**
  - must support at least content type text/plain
  - may support MIME type content including text/cpim
    - (Common Presence and Instant Message Format)



## SUBSCRIBE

- subscribe to specific event source "presence"

## NOTIFY

- PUSH message about status changes from the SIP server
- presence information in message body with some non-SIP means
  - e.g. Content-Type: application/cpim-pidf+xml