Research in an era of convergence

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INRIA

National Lab with 5 Research Units in Computer Science and Control

- 760 INRIA permanent staff
  - 350 researchers
  - 410 engineers, technical and administrative staff
- 240 researchers from other organizations
- 600 trainees, Ph.D students and post- doctoral researchers

Rennes

Rocquencourt

Lorraine

Rhône-Alpes

Sophia Antipolis

In 6 years, communications have grown

to become the leading partner for INRIA

in all sites

Scientific grand challenges

✓Mastering the digital infrastructure by learning how to program, compute and communicate over the Internet and over heterogeneous networks

✓Designing new applications making use of the Web and multimedia databases

✓Knowing how to produce reliable software

✓Designing and mastering automatic control for complex systems

✓Combining simulation and virtual reality

Major fields of application

- Telecommunications and multimedia
- Healthcare and biology
- Engineering
- Transportation, Environment

82 research project-teams

Grouped in four themes:

1 . Networks and Systems

2 . Software Engineering and Symbolic Computing

3 . Human-Computer Interaction, Data Management, Knowledge Systems, Image Processing,

4 . Simulation and Optimization of Complex Systems

World Wide Web Consortium (W3C)
ensuring the interoperability
of products and services available on the Web

Hosts

- MIT in North America, INRIA in Europe, Keio U. in Asia

Missions

- Specification, promotion of core standards of the Web
- Developing reference software

Members

- Some 400 companies and organizations worldwide

Domains covered

- Architecture
- User interface
- Socio-technological issues

A striking example

Signal processing and radio scanning

Cellular network software

Billing software (Dist. information system)

Internet and Web (WAP)

Local software (OS, smartcard, PDA, etc.)

Software complexity mindboggling

Network infrastructure
(Internet, mobiles)

Managing the optical resources or spectrum resources

Adjusting sizes: lines, buffers, caches, servers

Observing, managing, and optimizing the system

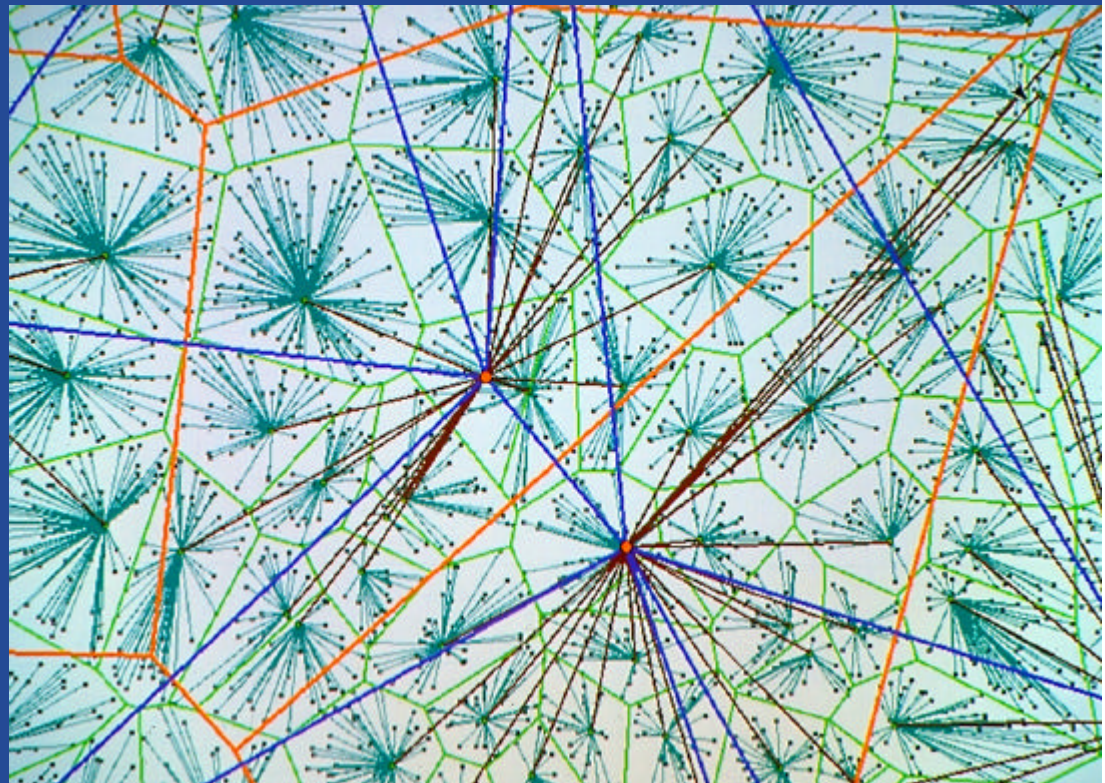Issues with multimédia data

Network economics

Quality of service

Operations Research

Probas + Géométry

Stats + Simulations

Protocols + algorithms

Multimedia
and
innovative network usage

Compression, source/channel Coupling, MPEG over IP

Progressive transmission of image ou graphical data

Affordable multimedia production and broadcasting, SMIL

Indexing image and video data bases

Correlating sound, speech, image, annotations

Games

Grid Computing

Massive ressource sharing

· 206 ·

Version
7.3.6

Time
0 / 40

Image
1 / 1016

Shot
1 / 31

Image in shot
1 / 32

Editing mode

None

Shots

Zones

Classes

Matches

No match

Voiture

Pour-

Maisons

Poursuite

Taunus

Verdure

John

Purley

Bandits

Roches

Step   Normal   Fast

Knowledge networks

Natural language: lexicons, analysis, dialogue, speech, …

Semi-structured, distributed data bases (eg. medical records)

Collaborative work: ideas and experimentation over a high speed backbone (VTHD)

Understanding, modeling and learning the behaviour of users

Programming Distributed Applications, Security
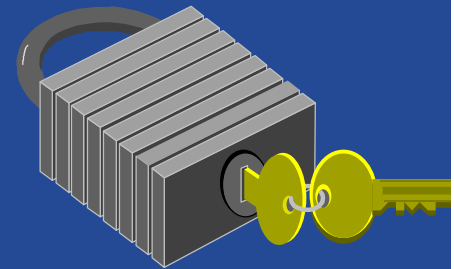
Programming and software architecture

- Reliable software, active networks
- Distributed objects, living with firewalls, highly changing network
- Saving energy
- Distributed applications, new formalisms

Algorithms

- distributed algorithms, routing
- Real-time Constraints

Security

- Cryptography and coding
- Fault Tolerance, system level security

Positioning research

➢Need to think about it

➢Be flexible and mobile, like start ups

➢IETF, W3C and other forums

➢Understand when to jump ship

Development

Innovation

Abstraction

Convergence has an impact

On research topics

On the diversity of partners from industry

On the interdisciplinary nature of research projects

On the mode of transfer of research results

On the scarcity of people with experience