

Enabling Grids for E-science

GRID-RTC

GRID Regional Training,

Cluj-Napoca
17-18, April, 2008

An EGEE-II training event

In loc de introducere
GRID computing, EGEE, EGI

- Paradigma “Parallel computing”
- Originile GRID
- EGEE – prezent si viitor
- Proiecte GRID
- Initiative GRID romanesti

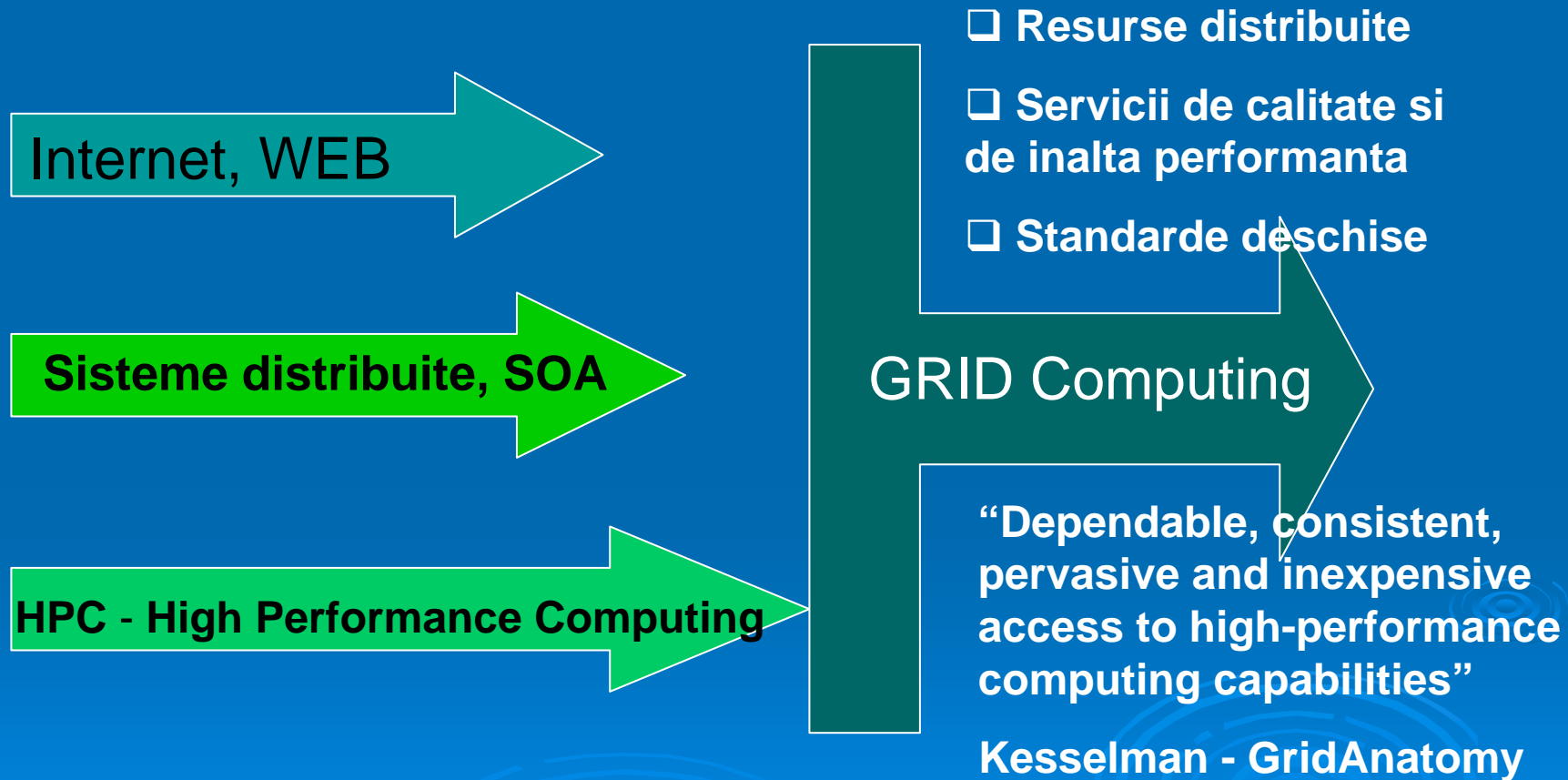
➤ Paradigma “Parallel computing”

- executia paralela - cresterea performantelor de calcul peste limitele impuse de tehnologie
- Limite de frecventa, putere consumata/disipata, limite de integrare
- Forme/nivele de paralelizare:
 - La nivel de date: SIMD, UAL multiple
 - La nivel de instructiuni: Arhitecturi Pipeline, Arh. Superscalare
 - La nivel de fire de executie: Hyperthreading, Multi-core
 - La nivel de task-uri, job-uri:
 - Arhitecturi paralele clasice: directia HPC (High Performance computing)
 - Arhitecturi distribuite: retele+PC-uri, Internet
 - **Arhitecturi GRID**

➤ Paradigma “Grid”

- Separarea furnizorilor si a consumatorilor de servicii/resurse – similar cu retelele electrice, retelele telefonice, TV-cablu, etc.
- Serviciile si resursele info-comunicationale – mult mai complexe, mai greu de administrat ca un sigur “produs”

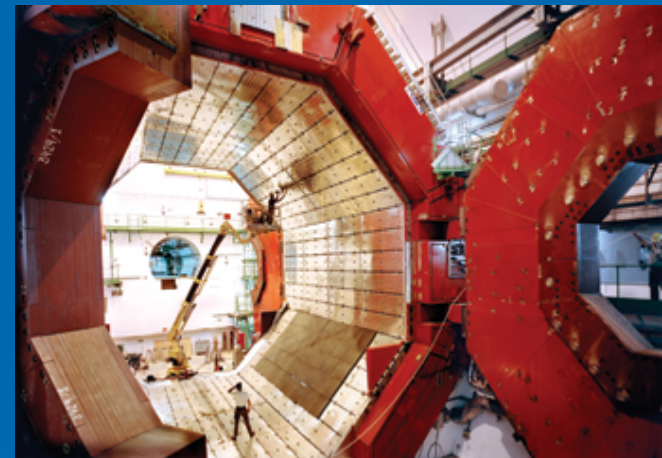
Originile GRID



EGEE

Enabling Grid E-science

- Infrastructura distribuita de calcul si de stocare pusa in slujba stiintei
- Suport pentru Experimente stiintifice de anvergura:
 - Fizica nucleara – fizica particulelor (CERN)
 - Biochimie, farmaceutica
 - Stiintele pamantului: geofizica, mediu,
 - Aeronautica: simulare
- Organizatii virtuale – colective/laboratoare internationale de cercetare
- In perspectiva - Suport de inalta performanta pentru companii furnizoare de servicii informatice (????)



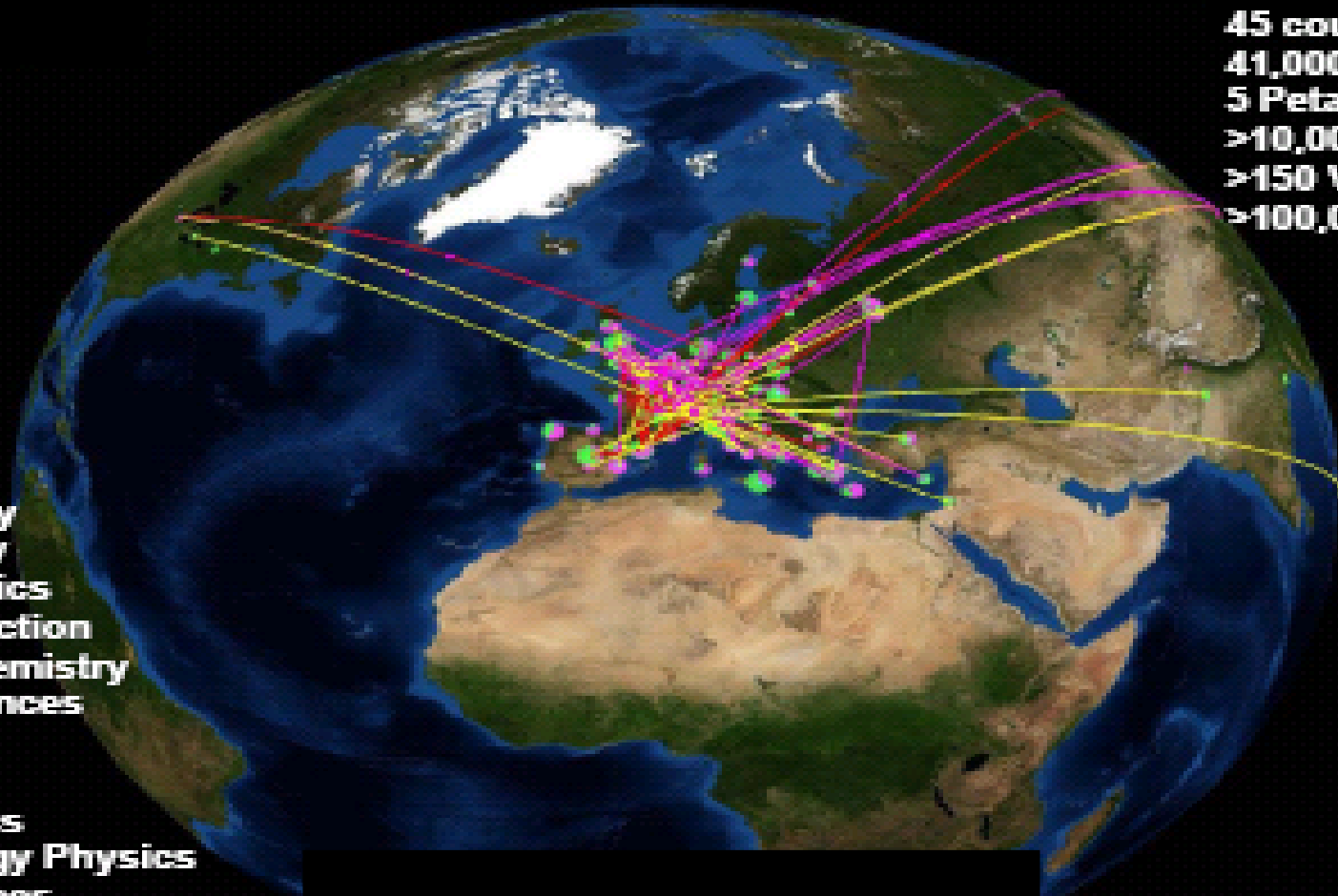
EGEE si CERN



EGEE in cifre

EGEE
Enabling Grids
for E-science

240 sites
45 countries
41,000 CPUs
5 PetaBytes
>10,000 users
>150 VOs
>100,000 jobs/day



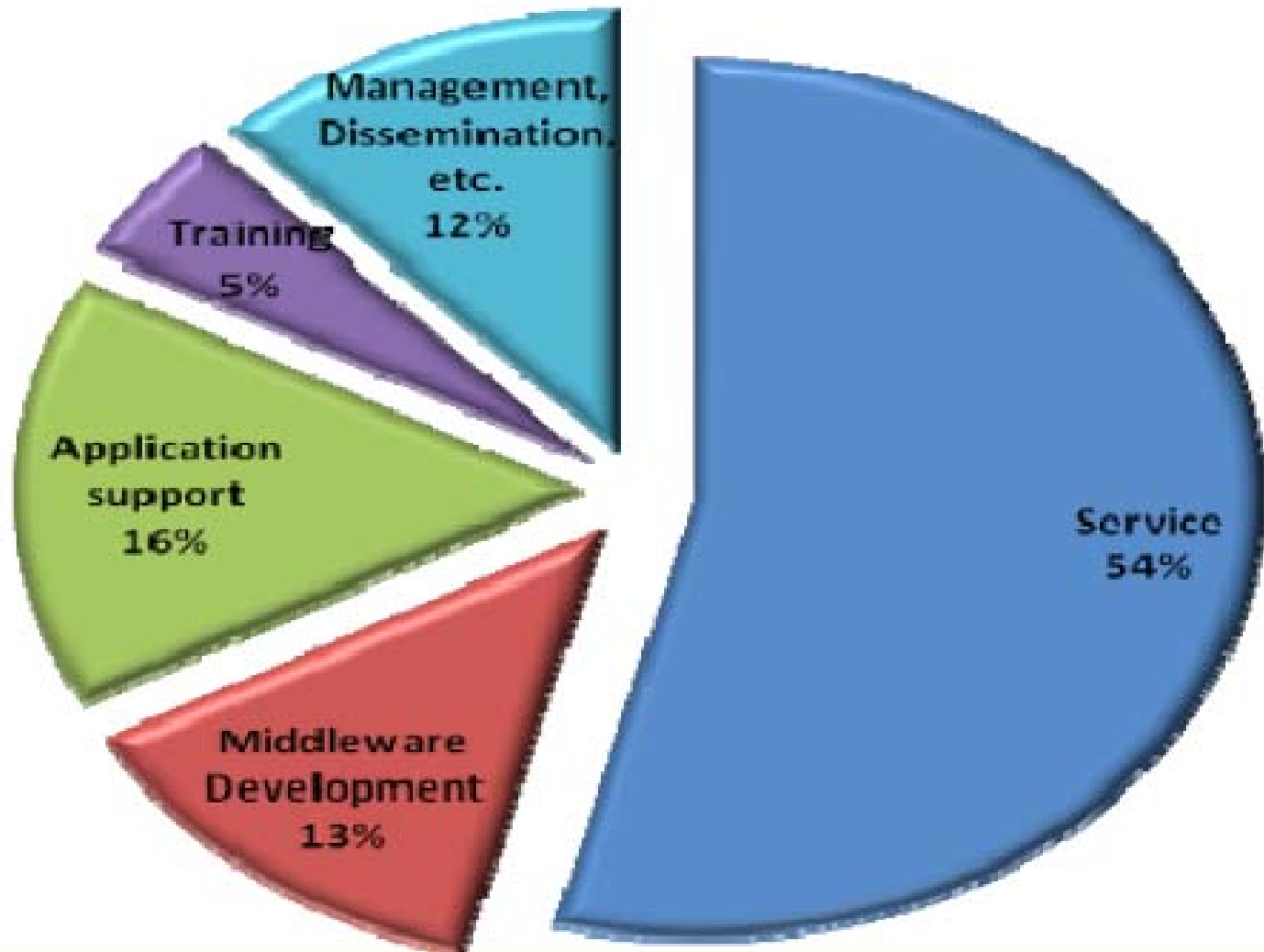
Archeology
Astronomy
Astrophysics
Civil Protection
Comp. Chemistry
Earth Sciences
Finance
Fusion
Geophysics
High Energy Physics
Life Sciences
Multimedia
Material Sciences

Sursa: Bob Jones, Director EGEE,
EGEE 2008, Budapesta



GridPP
UK Computing for Particle Physics

Activitati in cadrul EGEE II

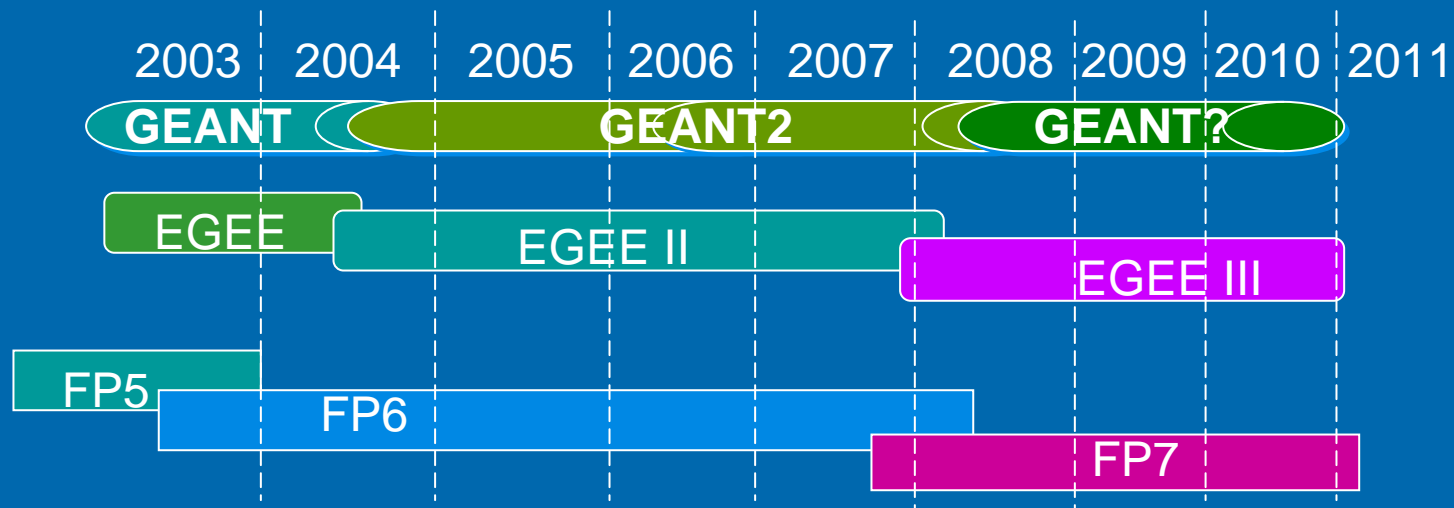


Activitati in EGEE

- **Networking Activities (NA)** – managementul si coordonarea tuturor aspectelor de comunicare in cadrul proiectului
- **Specific Service Activities (SA)** – activitati de suport, operare si management a infrastructurii Grid, furnizarea de resurse Grid
- **Research Activities (JRA)** - activitati de cercetare-dezvoltare in domeniul Grid

De la FP-6 la FP 7

De la EGEE II la EGEE III



Obiective EGEE III:

1. Extinderea si optimizarea infrastructurii existente

- Includerea mai multor resurse
- Suport pentru mai multe comunitati de utilizatori
- Mai usor de utilizat
- Noi standarde

2. De la un model bazat pe proiect la o infrastructura federativa de initiative grid nationale autosustenabil

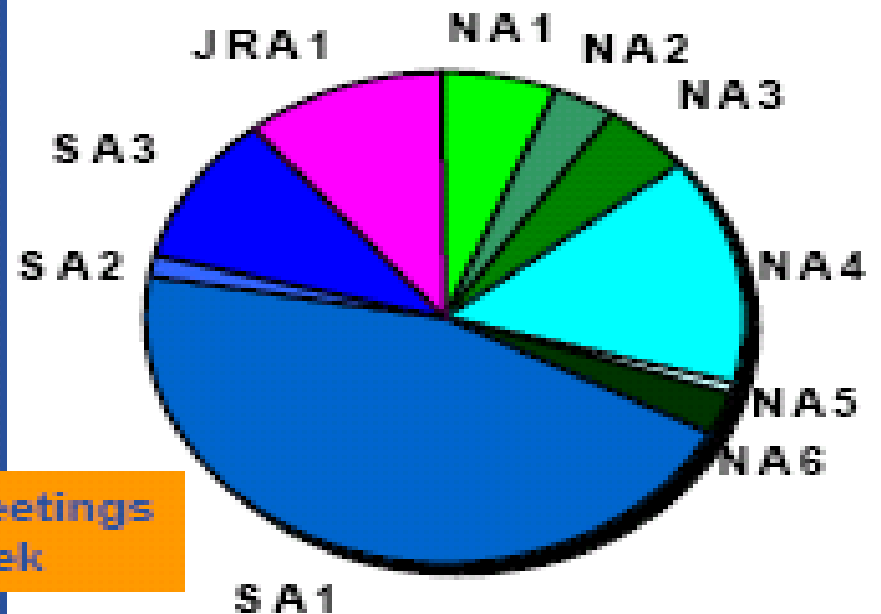
EGEE III



EGEE-III activities

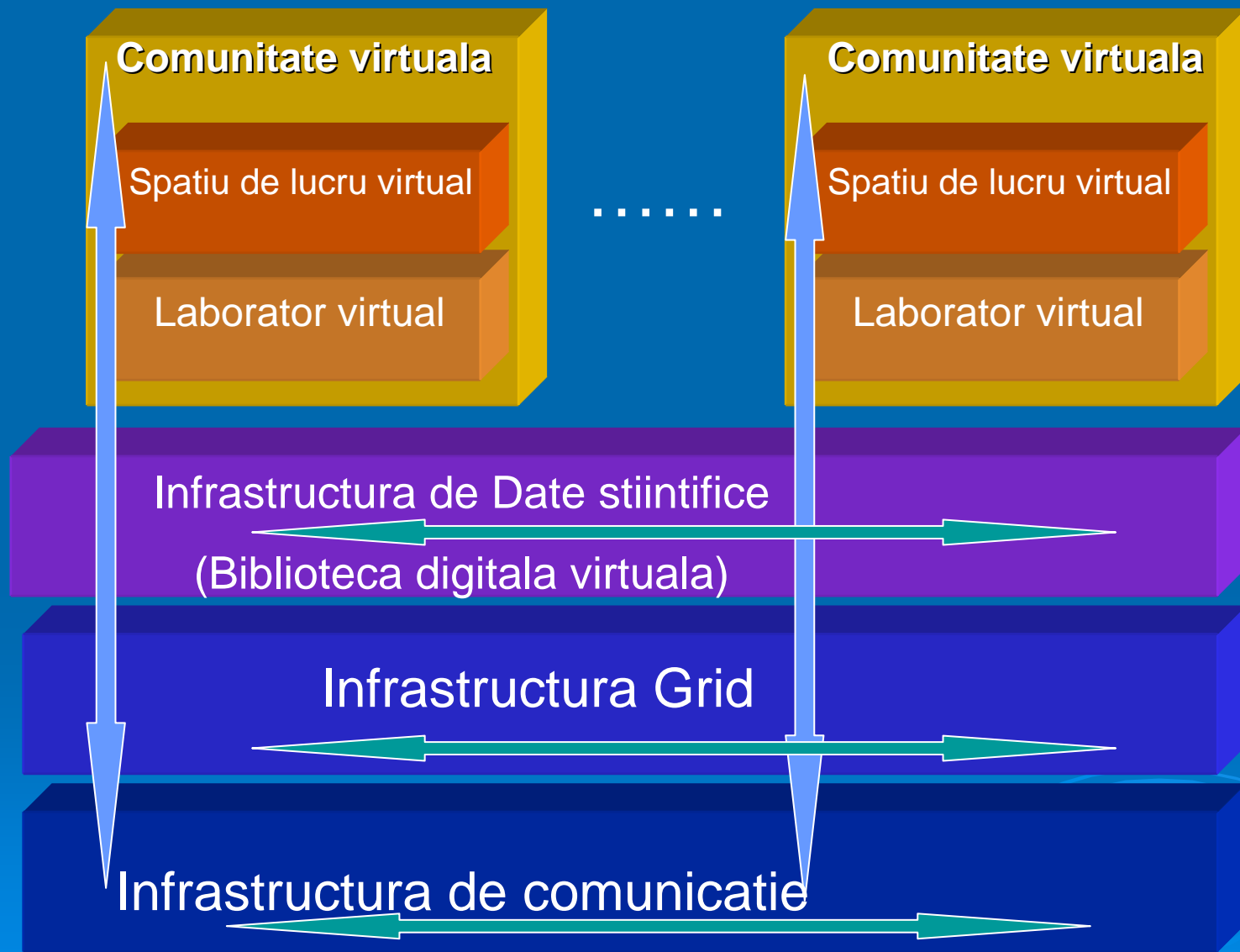
Networking activities	Specific Service Activities
NA1: Management	SA1: Grid Operations
NA2: Dissemination, Communication & Outreach	SA2: Networking Support
NA3: Training & Induction	SA3: Integration, testing & Cert.
NA4: User Community support and expansion	
NA5: Policy & International Coop.	Joint Research Activities
NA6: Technology Transfer & outreach to Business	JRA1: Middleware engineering

EGEE-II activity meetings throughout the week



9,997 Person Months, of which >4,500 contributed by the consortium from their own funding sources.

Comunitate de cercetare virtuala si globala



Proiecte EGEE – Grid

- Fizica energiilor inalte: ALICE, LHC, ATLAS, LHCb
- Aplicatii biomedicale:
 - **GATE** (a radiotherapy planning and medical tomography application);
GPS@ (Grid protein Sequence @nalysis):
 - **CDSS** (Clinical Decision Support System)
 - **Drug Discovery**
 - **SPLATCHE** (genome evolution modeling)
- Biblioteci digitale
 - **GRACE** (GRid enabled seArch and Categorization Engine)
 - **DILLIGENT** – modelarea bibliotecilor digitale pe Grid
- Astrofizica
 - **ESA Planck** – cartografierea microundelor ceresti
- Stiintele pamantului
 - **EGEODE** - Expanding GEOsciences on Demand
- Aplicatii financiare
 - **Egrid**

EGI – European Grid Initiative

- Proiect FP7, pe 2 ani (a inceput in sept. 2007)
- Obiectiv:
 - construirea unei infrastructuri Grid federative, sustenabile,
 - Infrastructura deschisa pentru o plaja larga de domenii stiintifice si utilizatori
 - Infrastructura sa depaseasca limitele unor proiecte nationale si/sau europene
 - Eforturi de standardizare
- EGI = federatie de NGI –uri (National Grid Initiative)
- In Romania: Romanian Grid Initiative, coordonat de Ministerul educatiei si cercetarii

Initiative Grid romanesti

➤ Consortii

- RoGRID – 2002



- **Locatii:** Bucuresti, Timisoara, Iasi, Cluj,

- **Institutii:** ICI, Politehnica Bucuresti, IFIN, INCAS, Univ. Bucuresti, Univ. Tehnica din Cluj, Univ. de Vest Timisoara

- Romanian Tire2 – 2007 – IFIN, ICI

- Romanian GRID Initiative – 2007

➤ Participari in proiecte europene:

- EGEE II si III

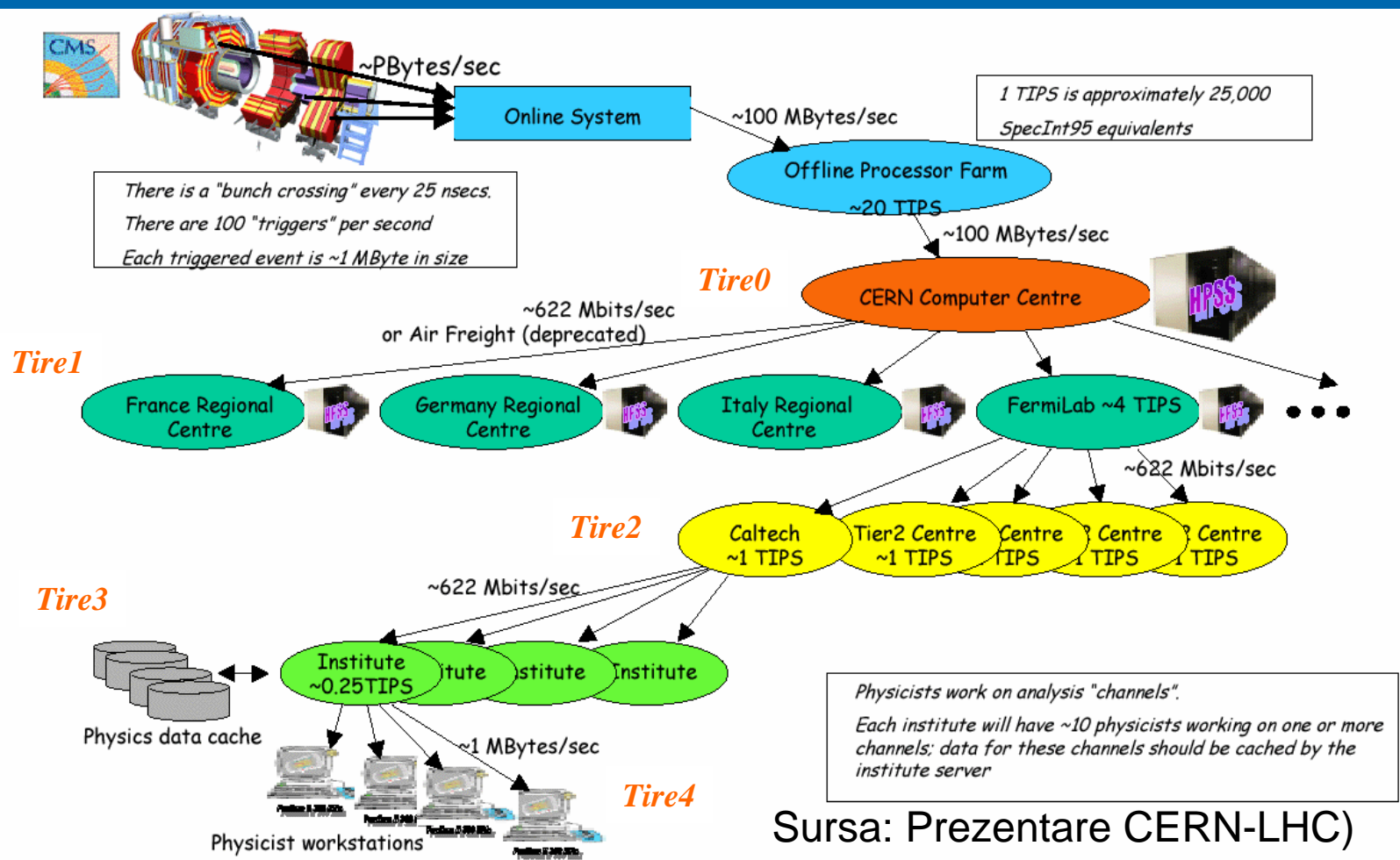
- SEE-Grid

- ??

CERN: Large Hadron Collider(LHC)

Raw Data: 1 Petabyte/sec

Filtered 100Mbyte/sec = 1 Petabyte/year = 1 Million CD ROMs



Sursa: Presentare CERN-LHC)

Concluzii

- Grid – “emerging technology”
- Avantaje:
 - Infrastructura performanta de calcul la indemana oricarui cercetator
 - Suport unic pentru proiecte de anvergura
 - Servicii de calcul si de comunicatie de calitate garantata
 - Acces controlat si securizat la resurse distribuite
 - Promoveaza cooperarea globala prin organizatii virtuale
- Dezavantaje (in forma actuala):
 - Orientat prea mult spre domeniul stiintific
 - Lipsa interactivitatii
 - Lipsa unei documentari adecvate
 - Instabilitate datorita ciclurilor prea scurte de dezvoltare si instalare a unor noi versiuni de infrastructura

GRID Regional Training, Cluj-Napoca

➤ Program:

<http://users.utcluj.ro/~sebestyen/gridtraining/gridTraining.html>

➤ Sectiuni:

- Instruire pe tehnologii Grid
- Prezentarea unor realizari in cadrul unor proiecte Grid
- Experimente de tip “hands-on” pe GRID

Program

➤ 17.04.2008

9:00 – Opening; overview on EGEE project (present and future) – Gheorghe Sebestyen (UTCN), Doina Banciu (ICI)

9:15 – Basic GRID concepts – Anca Hangan (UTCN)

10:00 – Break

10:15 – GRID Technologies I (Condor, OGSA-DAI) – Anca Hangan (UTCN)

11:00 – Coffee Break

11:15 – GRID Technologies II (Globus, gLite) – Anca Hangan (UTCN)

12:00 – Discussions, questions

12:30 – Lunch break

15:00 – Developing applications on GRID – Tunde Balint (UTCN)

15:45 – Break

16:00 – GRID resources for TIER 2 and EGEE - Banciu Doina(ICI), Bildea Ana(ICI) , Cristian Ciortan (Bucharest University)

16:30 – Geographical and environmental data processing over GRID – Dorian Gorgan (UTCN)

17:00 - Coffee break

17:15 – Cryptography and GRID – Rodica Potolea and Alin Suciu (UTCN)

17:45 - Digital Content Management on GRIDs – Gheorghe Sebestyen (UTCN)

18:15 - Discussions, questions

Program

- 9:00 – Hands-on Laboratory practice – Anca Hangan and Tunde Balint (UTCN)
- 10:45 – Break
- 11:00 – GRID administration and deployment – Emil Cebuc and Magherusan (UTCN)
- 11:45 – Coffee break
- 12:00 – Round table – Perspectives on GRID computing