Peer-to-Peer
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Branch & Bound

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Peer-to-Peer

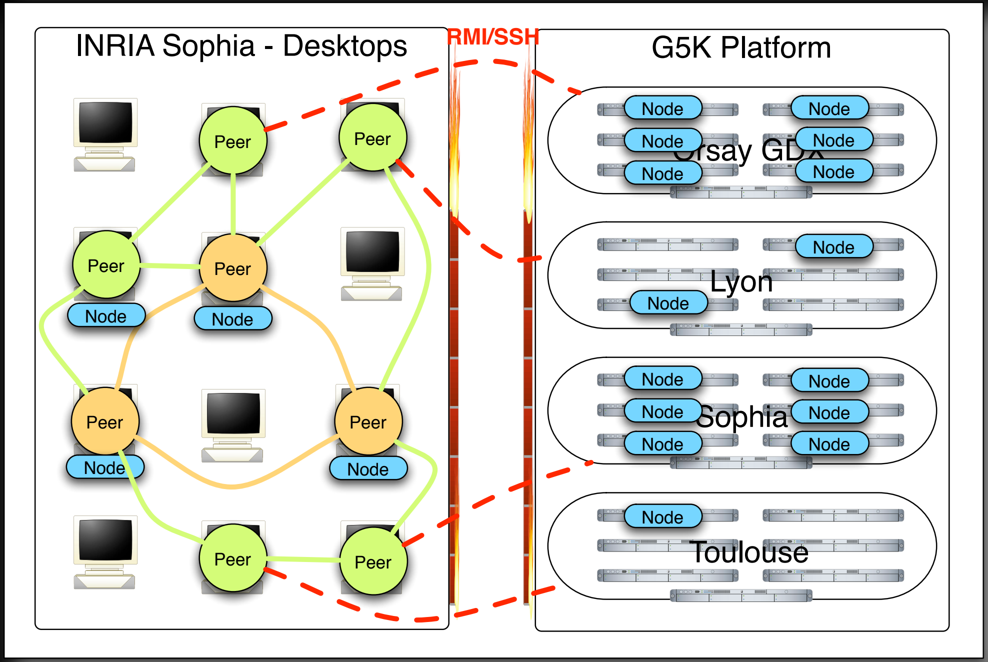
Mixing Desktop and Cluster Machines

- Sharing JVM for grid computing
  - Deploying communicating applications
  - Achieving computations that take months on clusters

- Infrastructure
  - Unstructured P2P overlay network
  - 3 request protocols:
    - 1 node: Random walk algorithm
    - n nodes: Breadth-First-Search (BFS) algorithm with acknowledgement
    - max nodes: BFS without acknowledgement
  - Best-effort

P2P: Results

- n-Queens: 25 Queens instance broken
  - 6 months to achieve
- 1008 CPUs: mixing Grid'5000 and INRIA Sophia desktops



P2P: Perspectives

- Dynamic number of neighbors
- Visualization and Monitoring tools

- Defining families of peers:
  - Abstraction of groups => unstructured P2P
  - QoS for Fault tolerance
  - Organizing communication at the application level

Branch & Bound

Provide a high level programming model for solving BnB problems, which manages task distribution and provides task communications.

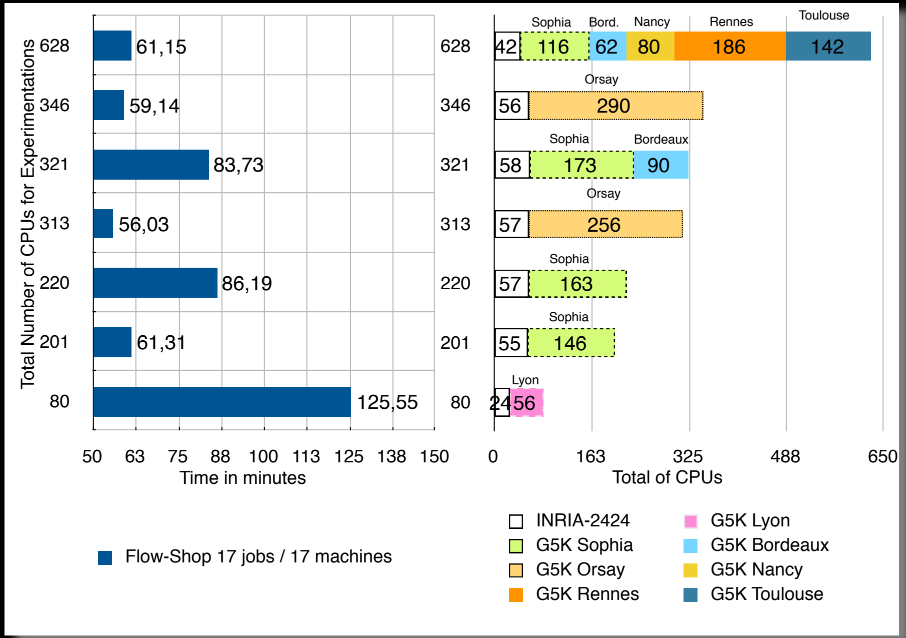
- Goals:
  - Exploring a search tree in parallel with communications for cutting bad tree branches
  - For the user the program distribution is hidden
  - Based on the Farm Skeleton (Bag of Task)
- Features:
  - Dynamic task split
  - Automatic result gather
  - Broadcasting best current result
  - Automatic backup and task reallocation
  - Choose and/or Create the queue for task allocation

B&B: Results

- Flow-Shop implementation:

  Deployed on 628 CPUs

  (G5K + INRIA Sophia)



BnB: Perspectives

- Hierarchical Master-Slaves
- Communication organization
  - Node Tags

- Scheduler of tasks
- Skeletons

Conclusion

- Large scale experimentations
- P2P + Load balancing + Fault tolerance
- Non-functional Technical Services