Canadian Space Agency | Agence spatiale canadienne

GSAW 2004

March 29 - April 1, 2004

Manhattan Beach, California

Simplifying ground segment reconfiguration

Philip Melanson

Canadian Space Agency

Collaborators: L. Hartman, P. Samson, D. Rivard

Canada

GSAW 2003 quote

"Make accessing satellites as easy as accessing Google."

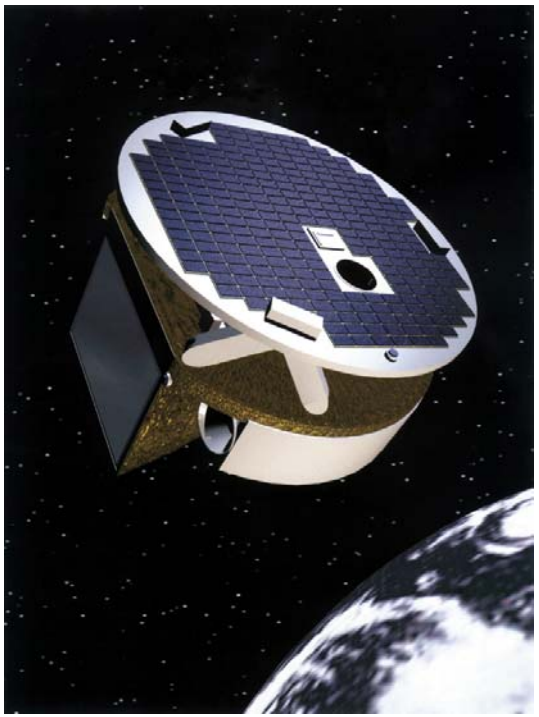
Why it should be as easy as Google?

- **It's a just-in-time world !**
- **Reduction of barriers between payload and users**
- **Support to Time critical initiatives**
  - The International Charter on Space and Major Disasters

Google analogy: Remote data access

Scisat-1 LEOP support

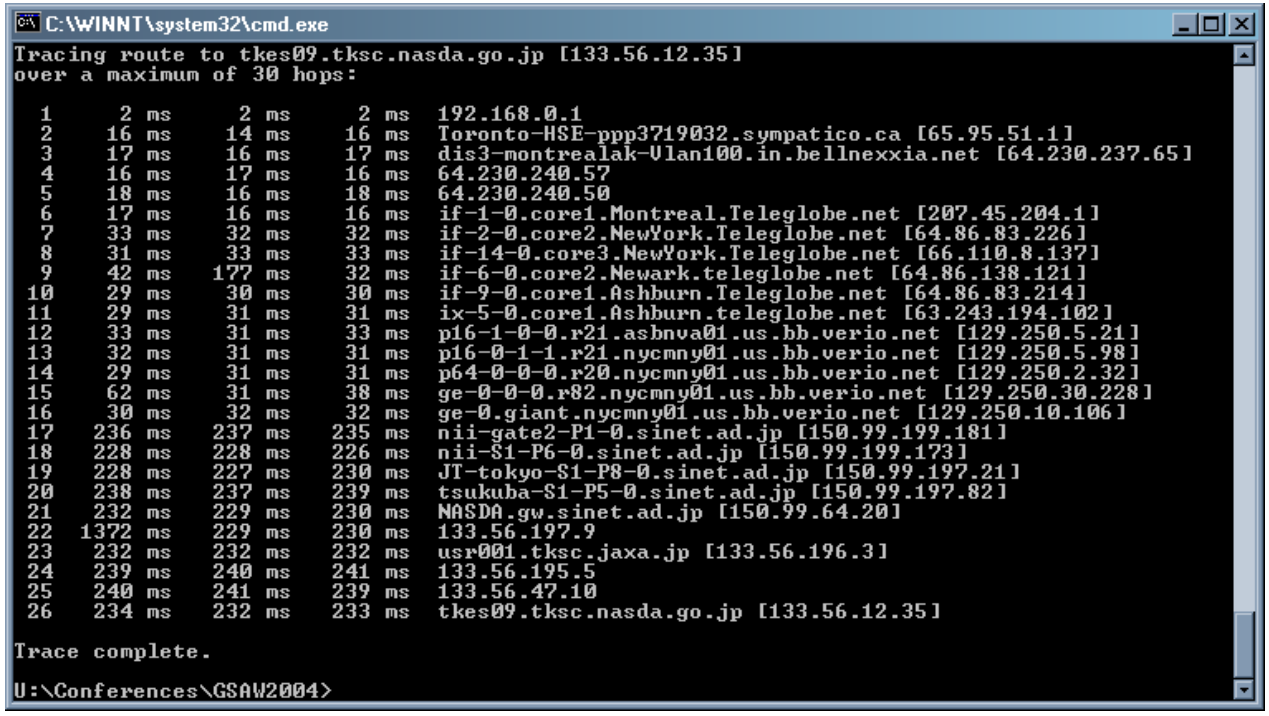
- Effort of 60 days to ensure compatibility
- Skilled and trained professionals required



Google analogy: Remote data access

Access to NASDA web page

- Little effort, takes less than 2 seconds
- Only basic computer training required



Google analogy: Remote data access

Similarities:

- Goal: Access to data from remote location
- Environment: Geographically dispersed systems
- Ownership: Owned & operated by various organizations

Differences:

- Space industry lacks business model for open access
- Cost of assets

Challenges

- Software crisis
  - Lack of software standards
  - Segmentation / integration problem
  - Now a systems level problem

Vision

- **Lead up time should be eliminated**
- **Achieve quick & simple reconfiguration**
- **Develop business model for open access**

"Google" access to satellites

→ Reuse existing infrastructure

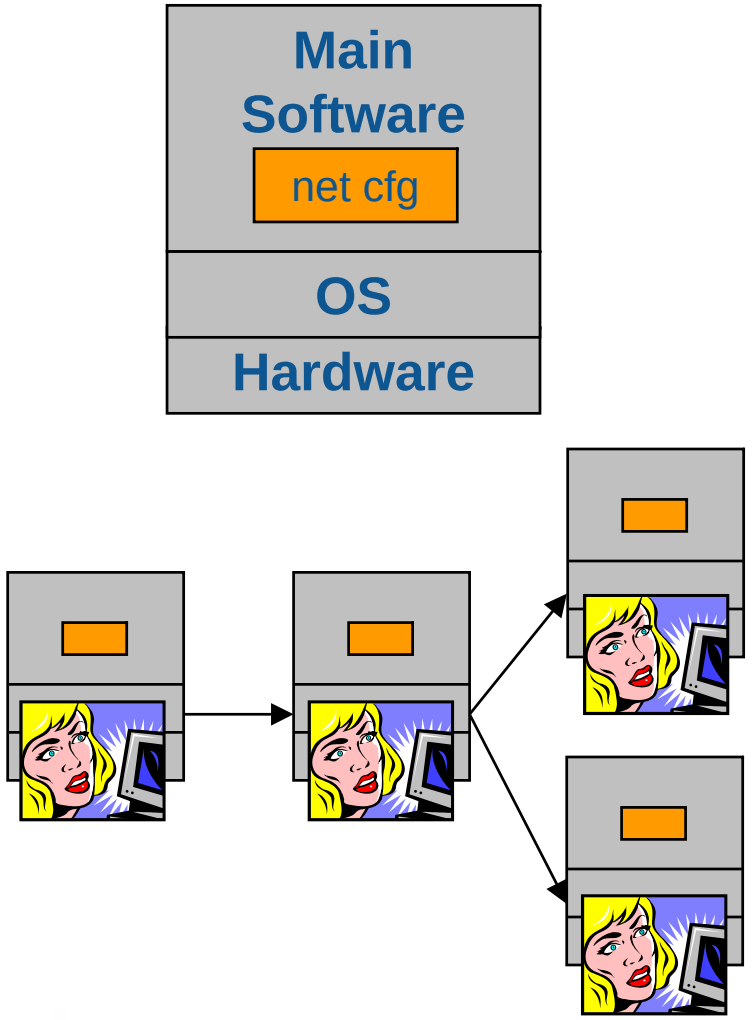
→ Increase interoperability

→ Simple & quick reconfiguration

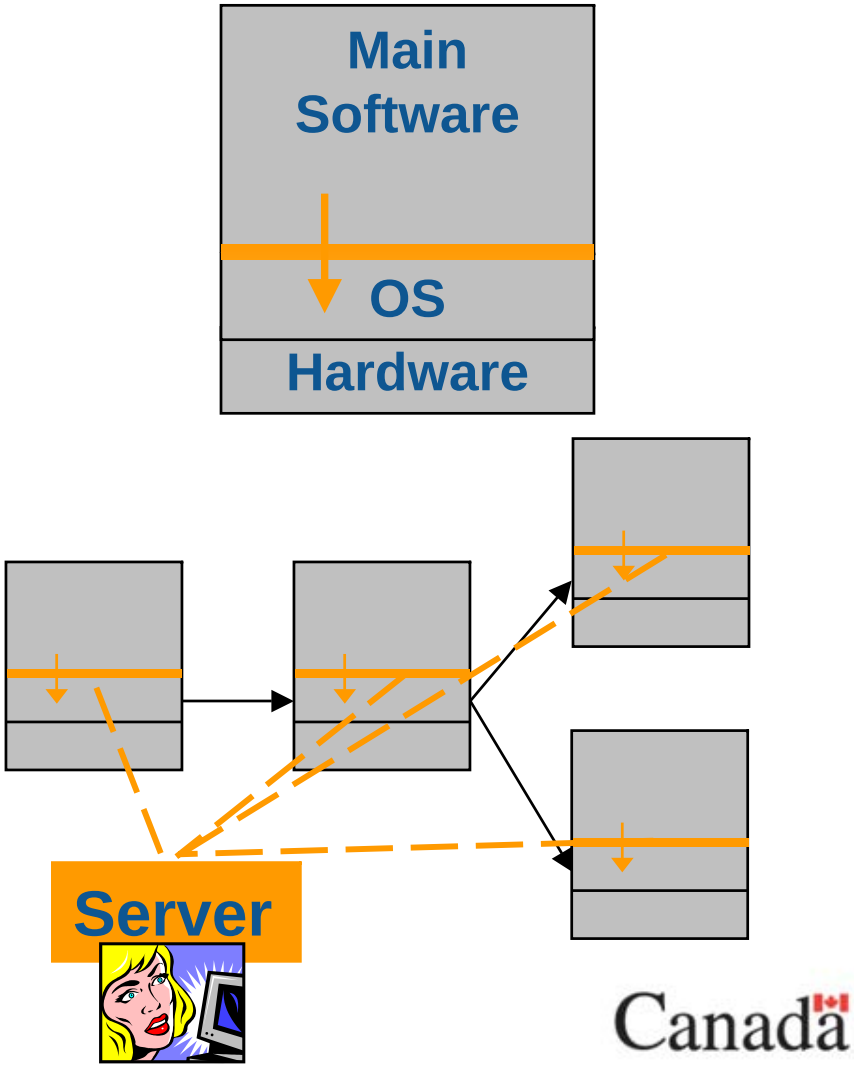
→ Middleware is a suitable standard

Networking & middleware

Without middleware



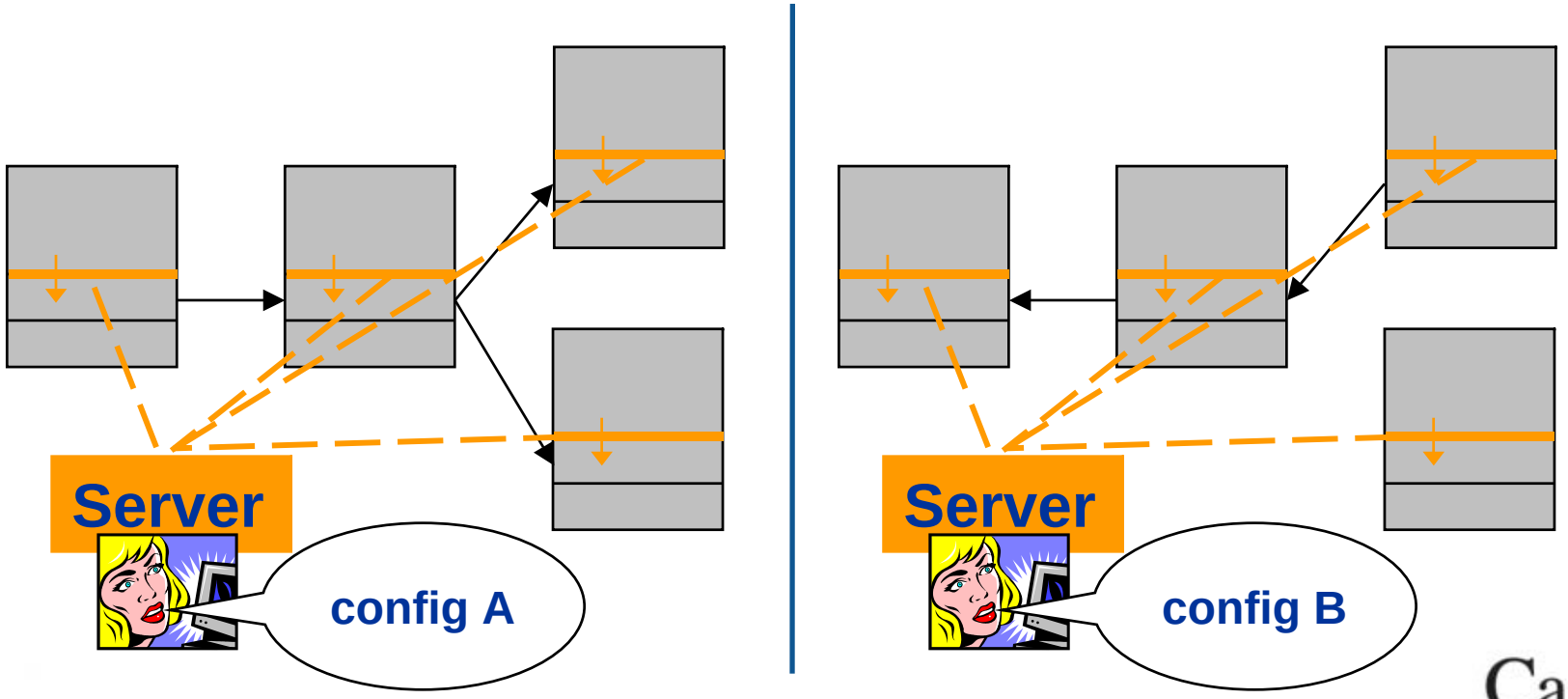
with middleware



CSA research activity

Objective:

- Create configuration entities
- Autonomously reconfigure entire ground segment



System Overview

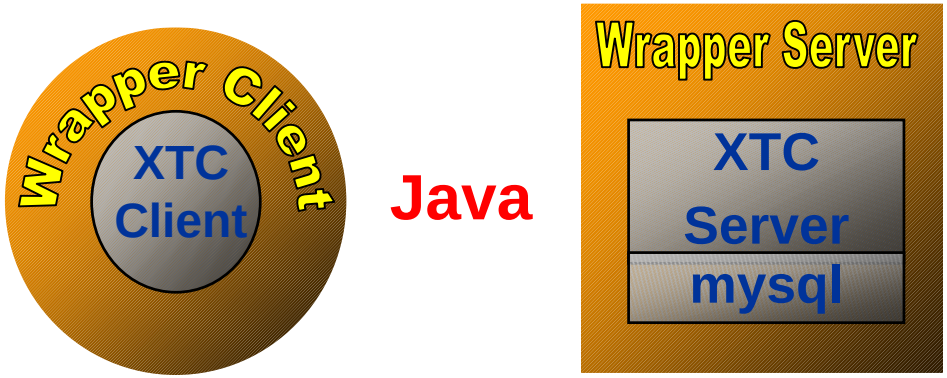
Driving requirements

- Manage connections
- Manage and create configurations

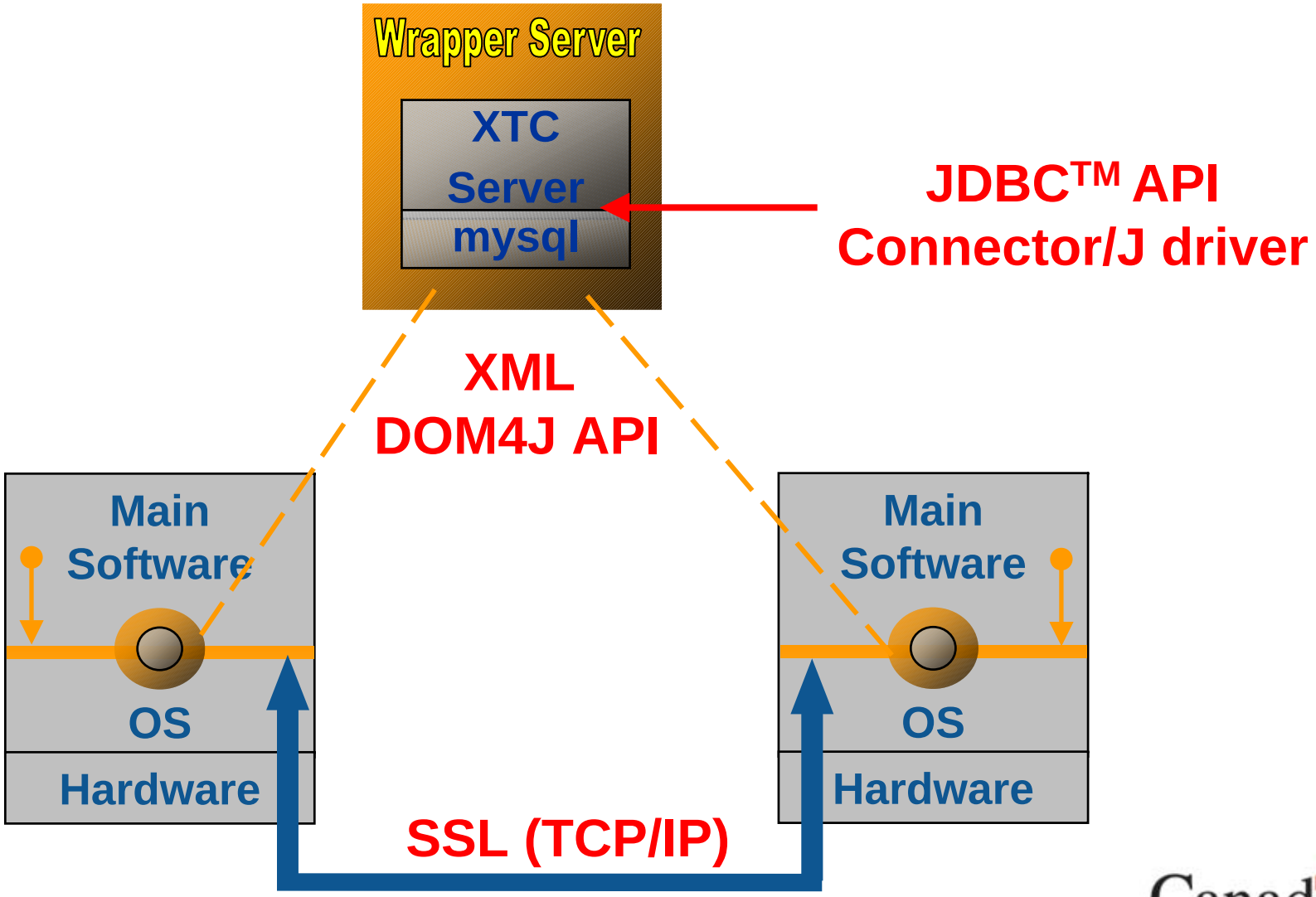
Main components

- XTCommunicator, from Xiphos Technologies
- Parent server
- Distributed clients

xiphos.ca



Components / Technology



Implementation : Space Servicing and Assembly

operations planning

contact dynamics analysis

real-time robotic controls

onboard automation

spacecraft simulation

ground control software

Lessons learned

The Good

- XML based interface
- JUnit : Automated regression testing

The Bad

- Data base interface: designing object data model

Solution

Will experiment with Evolution tool from Sygenics

SYGENICS CORPORATION

www.sygenics.com

Conclusion

Solve the software crisis first

How ?

- Continue R&D in ground segment field
- Support / contribute standards organization
- Demand interoperability from COTS vendors