Secure File Sharing

"SRFS on Ether" with host-to-host IPSec connection over the Pacific Ocean link

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Japan Aerospace eXploration Agency

SC06

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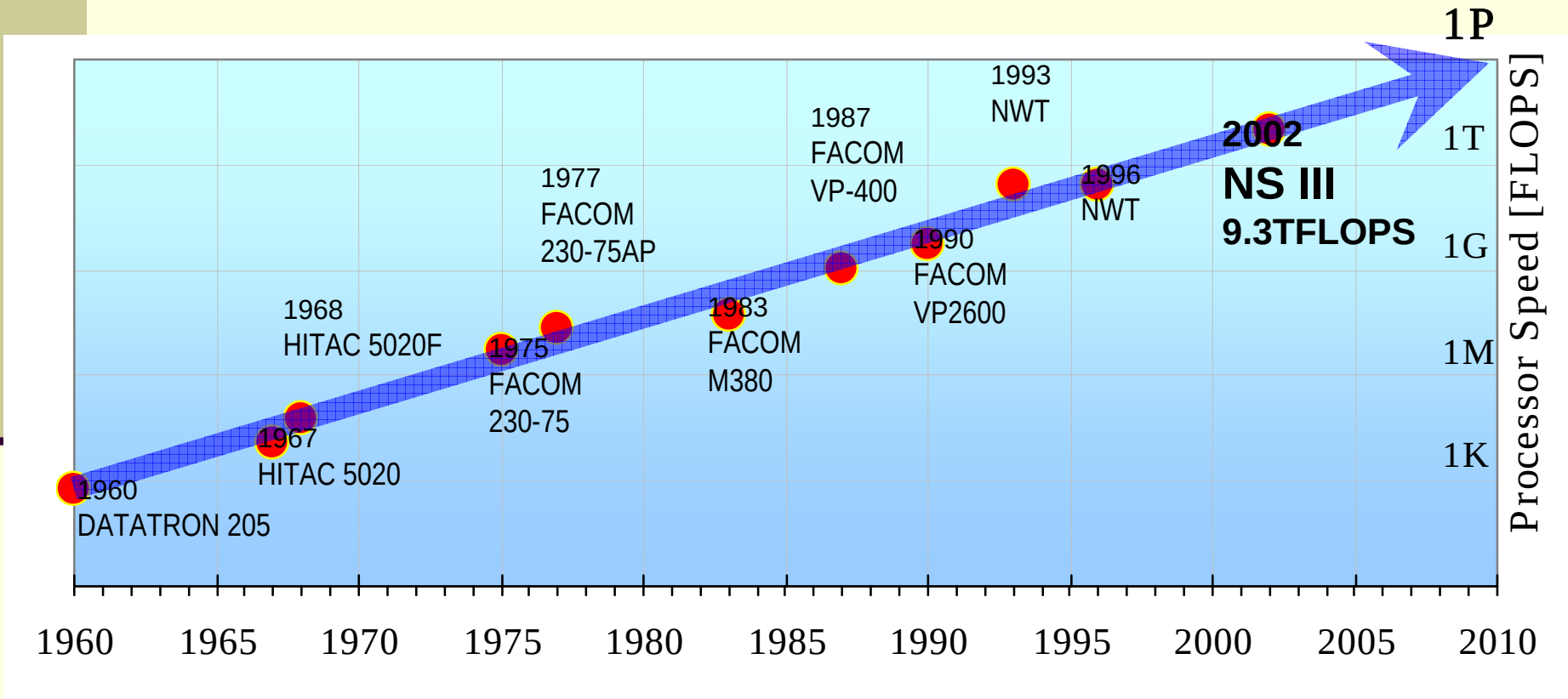
Background

HPC-System becomes huge system

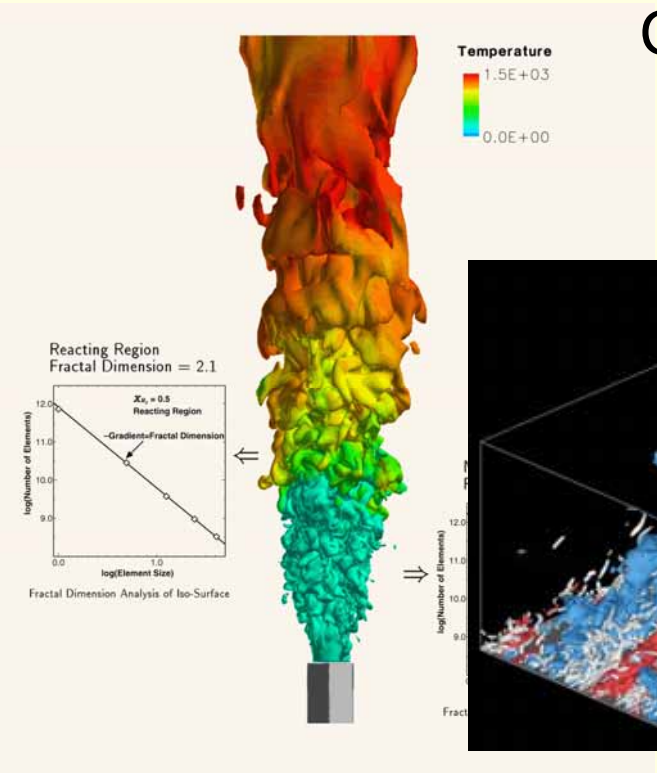


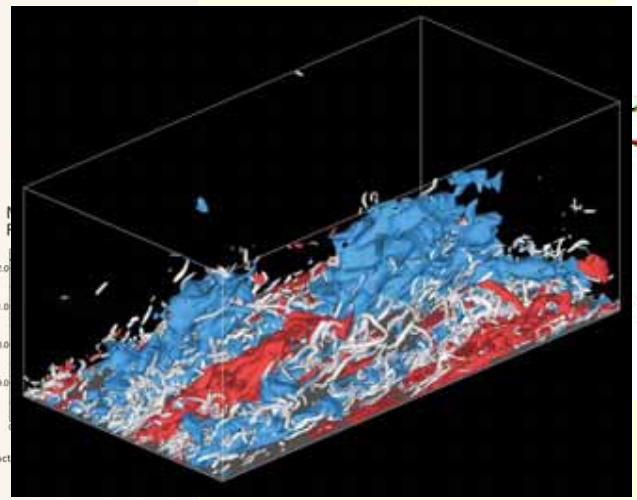
History of our HPC-systems

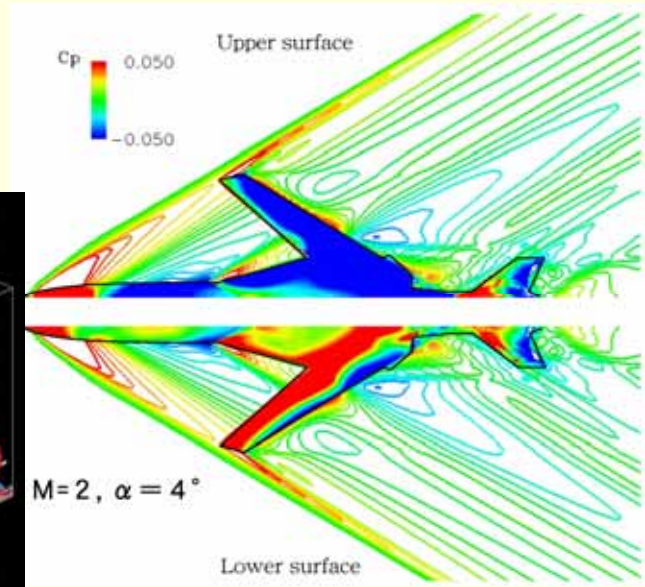
Background

Recent CFD simulation codes generate TB-class result file

CFD : Computational Fluid Dynamics







Background

Real-time visualization is necessary for CFD simulation

- Understanding the complex phenomena
- Monitoring to debug large-scale job
- Steering the simulation

ex. Huge turbulence computation with real-time visualization

Grid points : a = 1024 x 1024 x 1024 [points]

Information quantity per grid : b = 5 [variables/point]

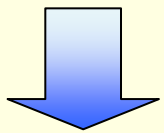
Length of variable : c = 8 [Bytes/variable]

Calculation time : d = 500 [hours]=1800000[sec]

Time calculation steps : e = 1.2 x 106 [steps]

Visualization frequency : f = @ 100 time calc. steps

Number of visualization : g = 1000

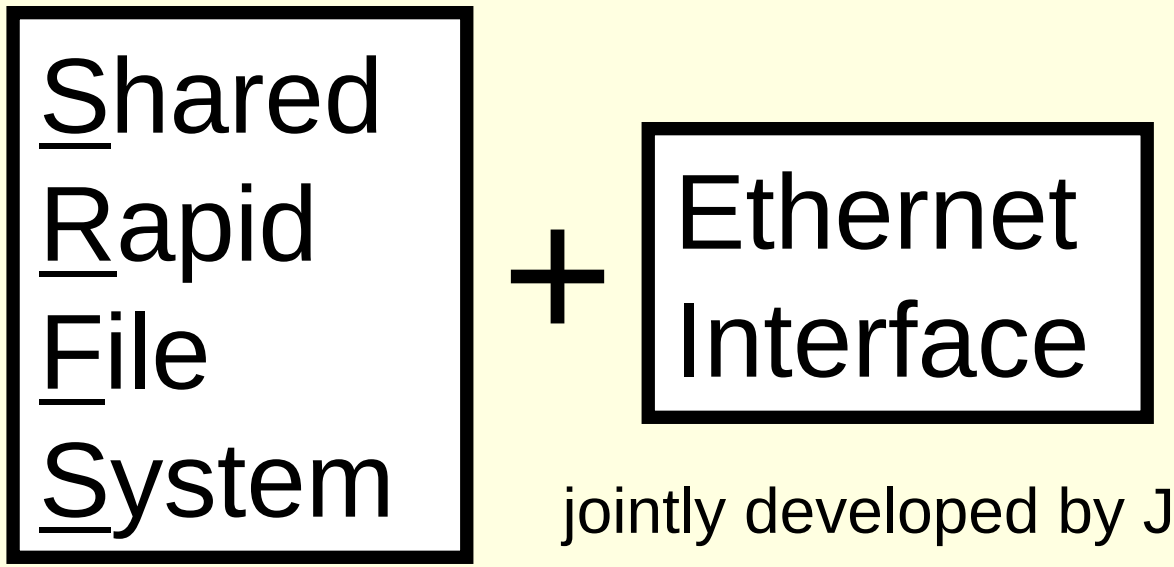


File Size = a x b x c x g = **39.1 [TB]**

IO Speed = (a x b x c) / (d / e x f) = **273 [MB/sec]**

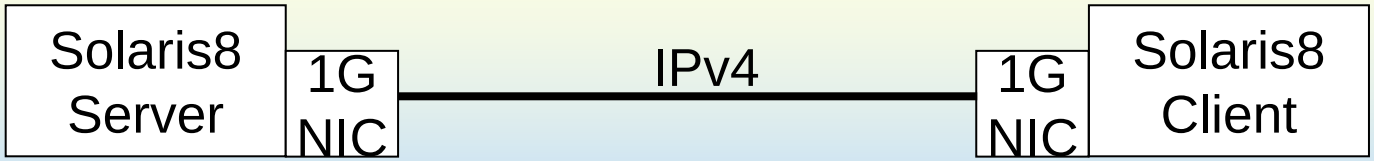
Solution

"SRFS on Ether" Remote File System for HPC-users especially



jointly developed by JAXA and Fujitsu

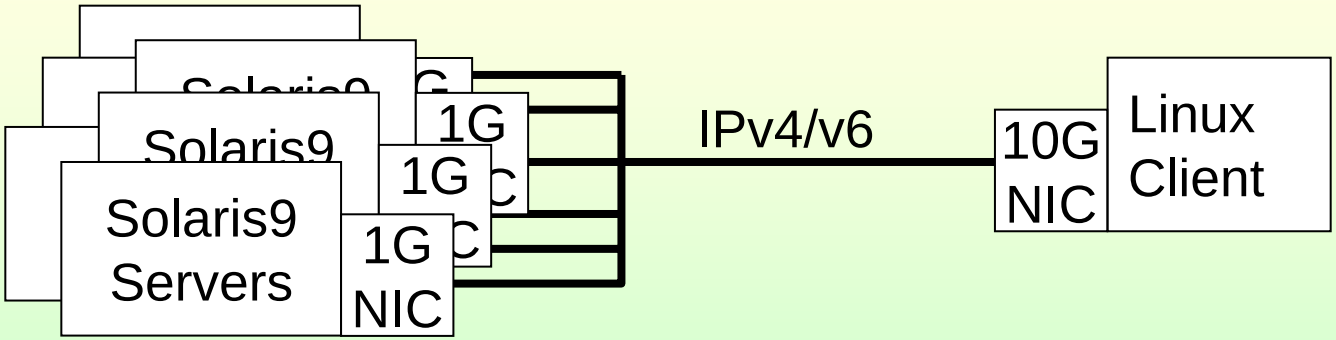
SC2004 - Performance evaluation on Real Long Fat Network



Solaris8 Server to Client with 1G-NIC

MAX 800(Mbps)

SC05 - Multi-to-Single machine connection over IPv4 / IPv6



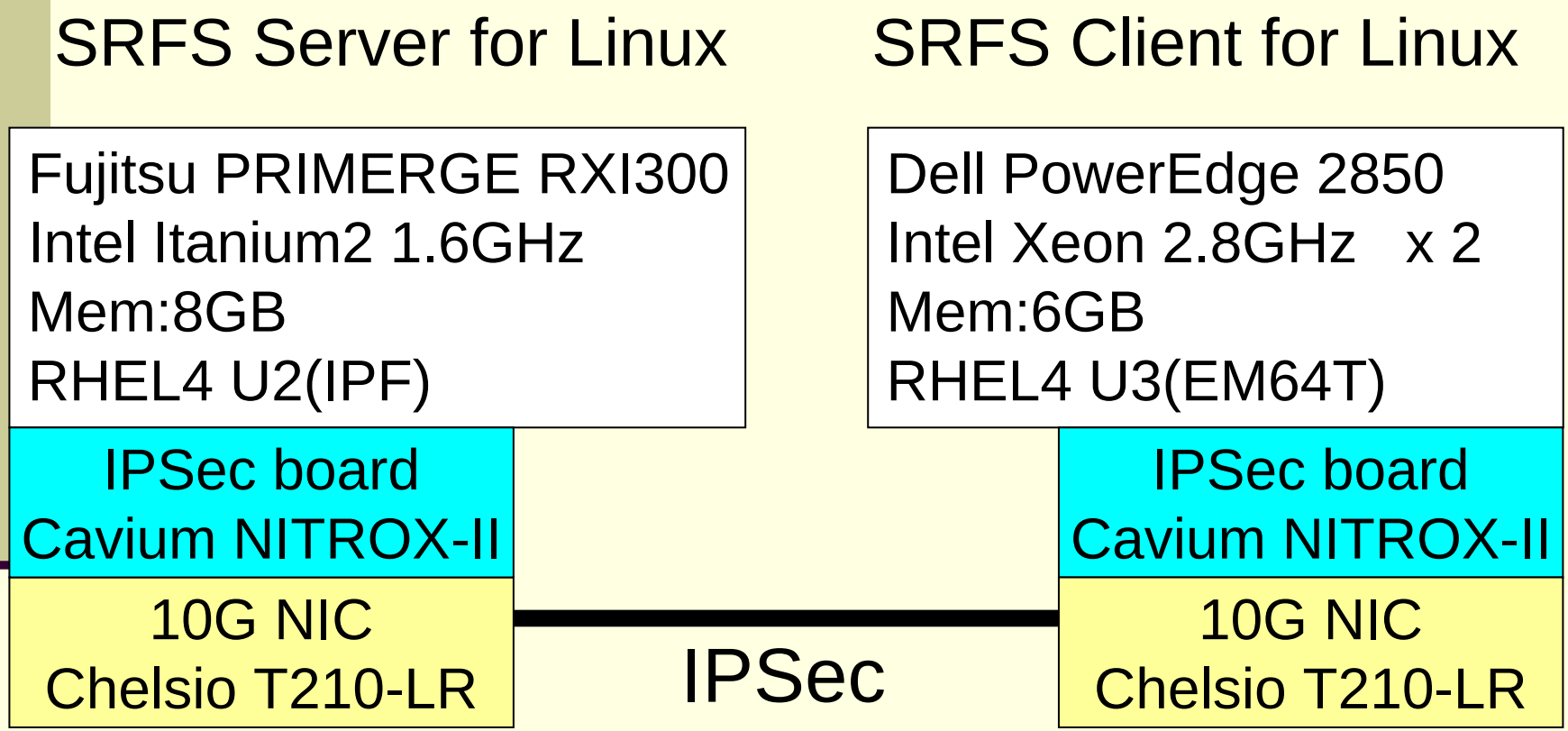
6 Solaris9 Servers with 1G-NIC to 1 Linux Client with 10G-NIC

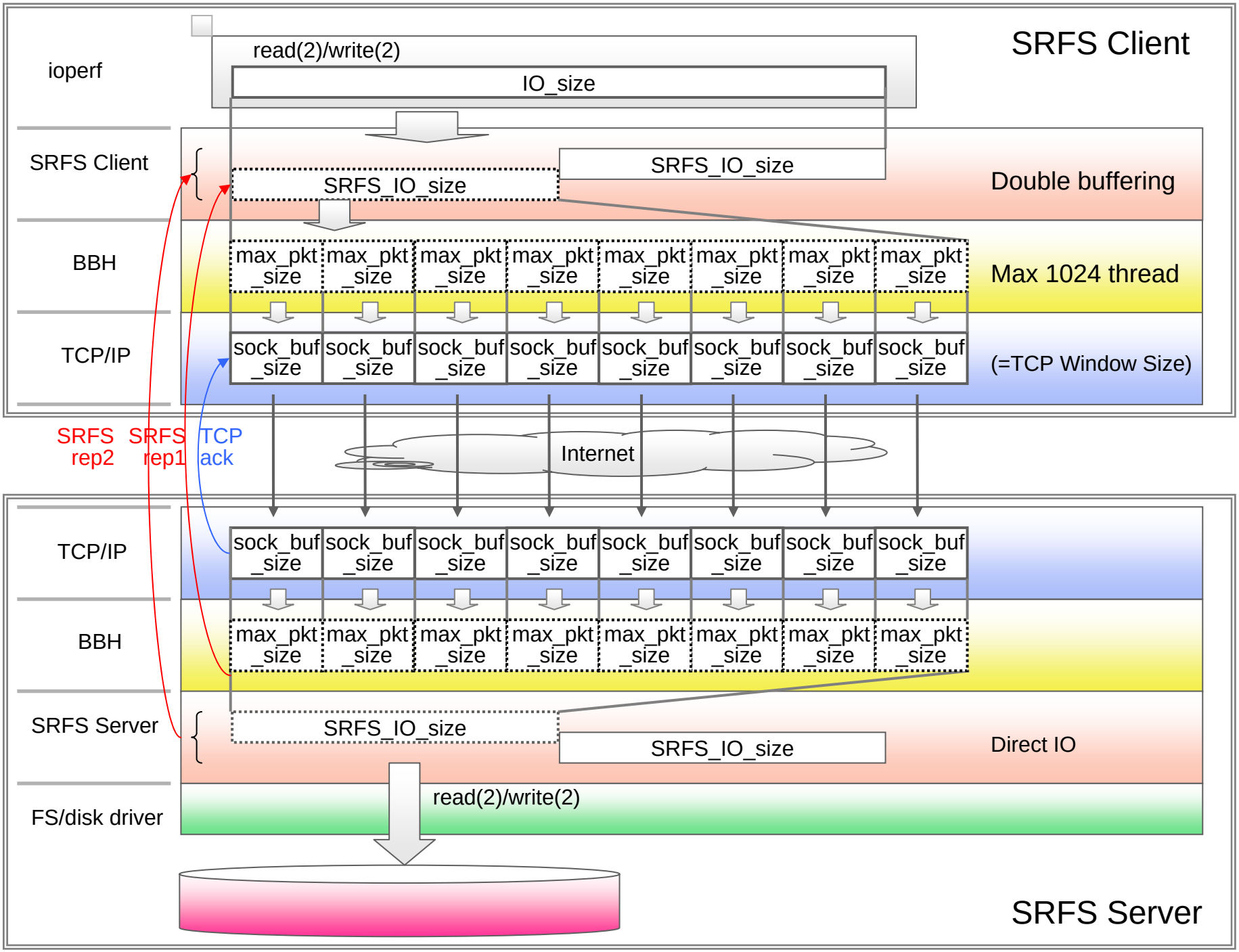
IPv4 5.4(Gbps) , IPv6 4.3(Gbps)

Demonstration in SC06 BWC

"SRFS on Ether" with host-to-host IPSec over the Pacific Ocean link

System


SRFS Server for Linux
SRFS Client for Linux
Fujitsu PRIMERGE RXI300
Intel Itanium2 1.6GHz
Mem:8GB
RHEL4 U2(IPF)
Dell PowerEdge 2850
Intel Xeon 2.8GHz x 2
Mem:6GB
RHEL4 U3(EM64T)
IPSec board
Cavium NITROX-II
IPSec board
Cavium NITROX-II
10G NIC
Chelsio T210-LR
IPSec
10G NIC
Chelsio T210-LR


SRFS Client
ioperf
read(2)/write(2)
IO_size
SRFS Client
SRFS_IO_size
SRFS_IO_size
Double buffering
BBH
max_pkt_size
Max 1024 thread
TCP/IP
sock_buf_size
(=TCP Window Size)
SRFS rep2
SRFS rep1
TCP ack
Internet
TCP/IP
sock_buf_size
BBH
max_pkt_size
SRFS Server
SRFS_IO_size
SRFS_IO_size
Direct IO
FS/disk driver
read(2)/write(2)
SRFS Server

Thank You for your attention!

If you have any questions
Please visit JAXA booth

#851

Support of science mission

PIV : Particle Image Velocimetry

http://www.kanomax.co.jp/fpiv.html

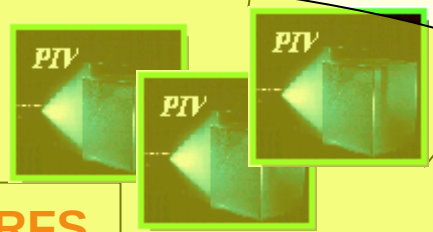
CIFS Folder

SRFS on Ether

SRFS Folder

SRFS Client

High Speed Backup

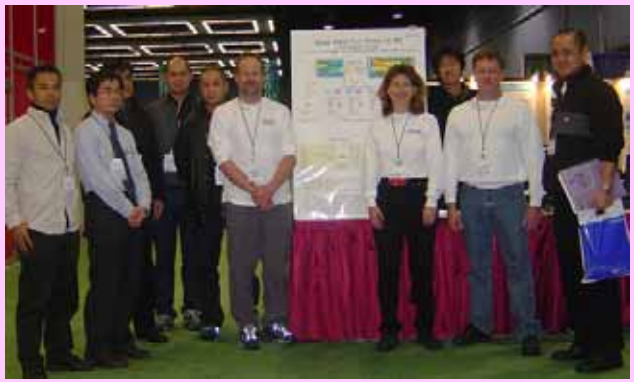


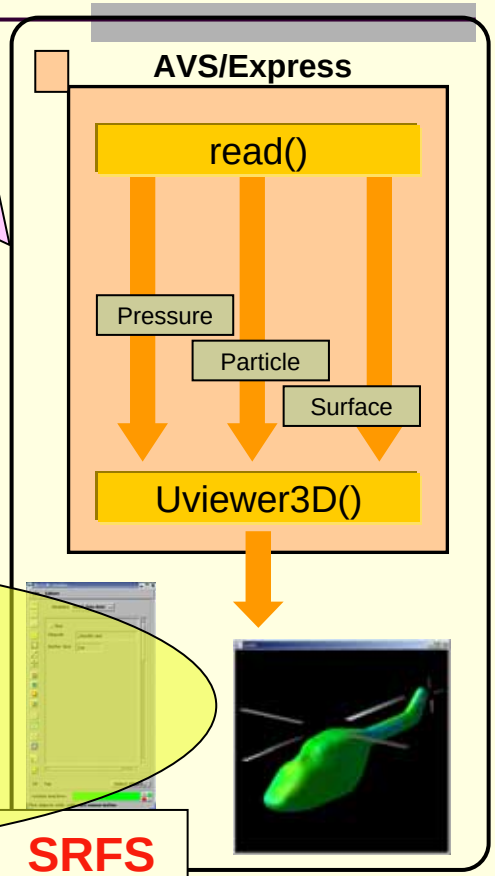
SRFS Server

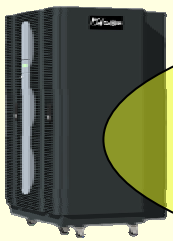
Support of science mission

ITBL : IT Based Laboratory

We demonstrated this issue at SC05 Bandwidth Challenge







SRFS on Ether

SRFS Server

SRFS Client

Remote Interactive Visualization

Use of production network at our home institution

Network Log

Trap

MIB

Admin Log

Trap

MIB

SRFS on Ether

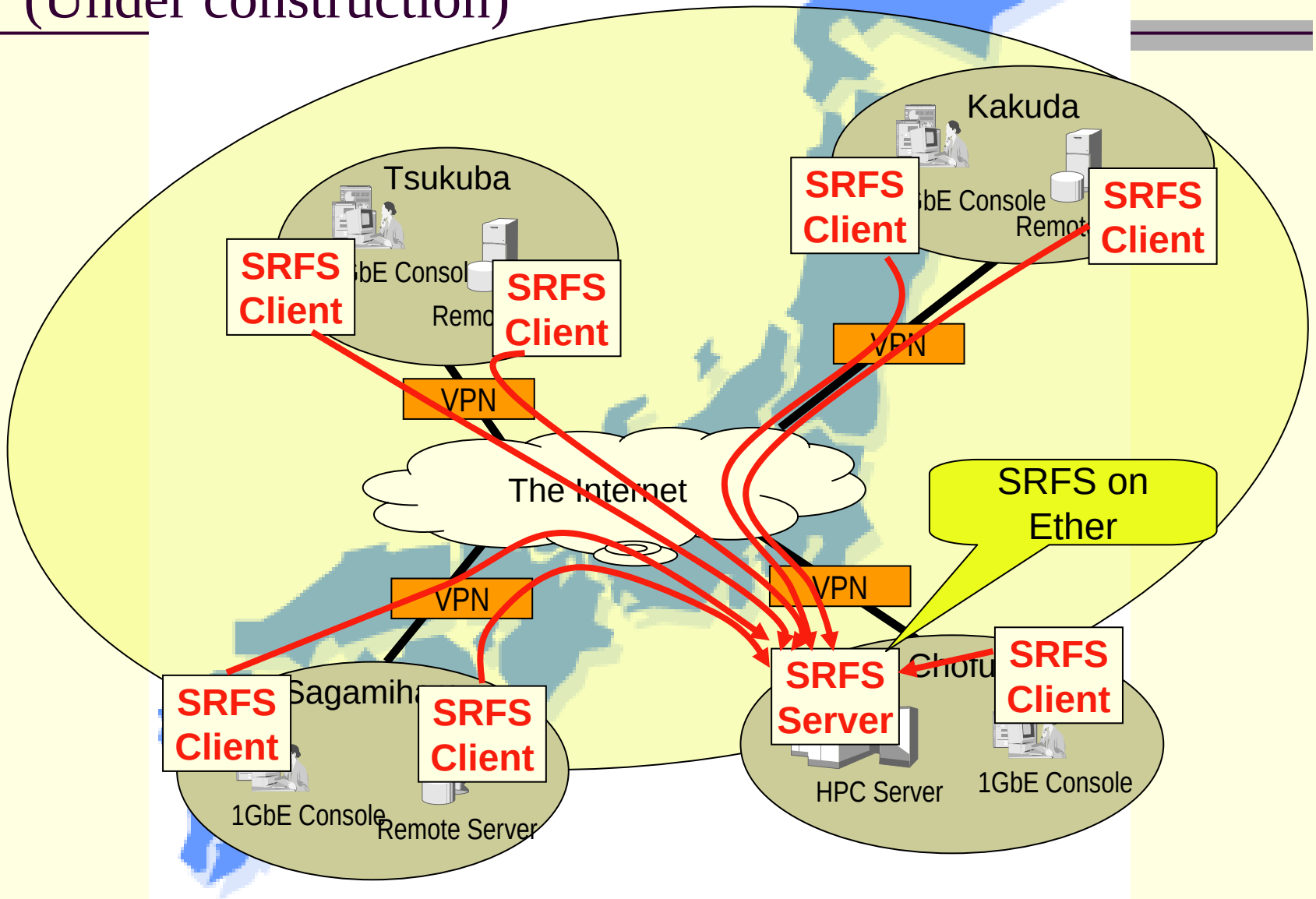
SRFS Client

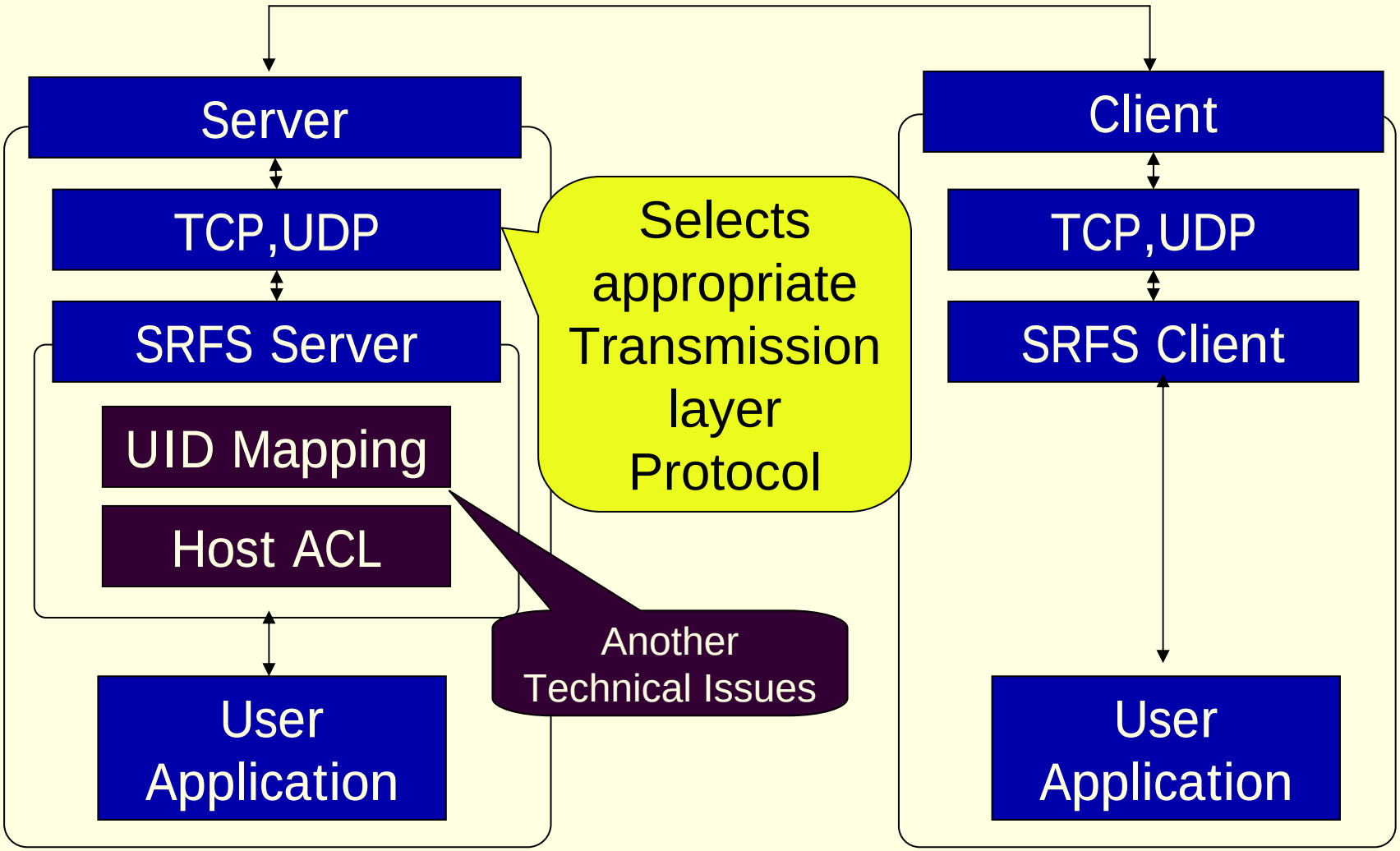
High Speed Archive

SRFS Server

Use of production network at our home institution

JSS:JAXA Supercomputer System (Under construction)



Innovative use of protocols

Protocol Switching on *SRFS on Ether*