

# Controls developments at SPring-8

- look into the future from the past -

Toru OHATA/SPring-8



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- System Overview
- Networking
- Toward the future
- TNG



# CONTENTS

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# CONTENTS

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# Beamline control system covers ...

## Insertion Device

 gap, phase, st-magnet, ...

## Front-End

 filters, masks, slits, ...

## Transport Channel

 varies optics

## Interlocks

 shutters, vacuum, ...

\*except experimental station controls



# Overview of “MADOCA”

“Message And Database Oriented  
Control Architecture”

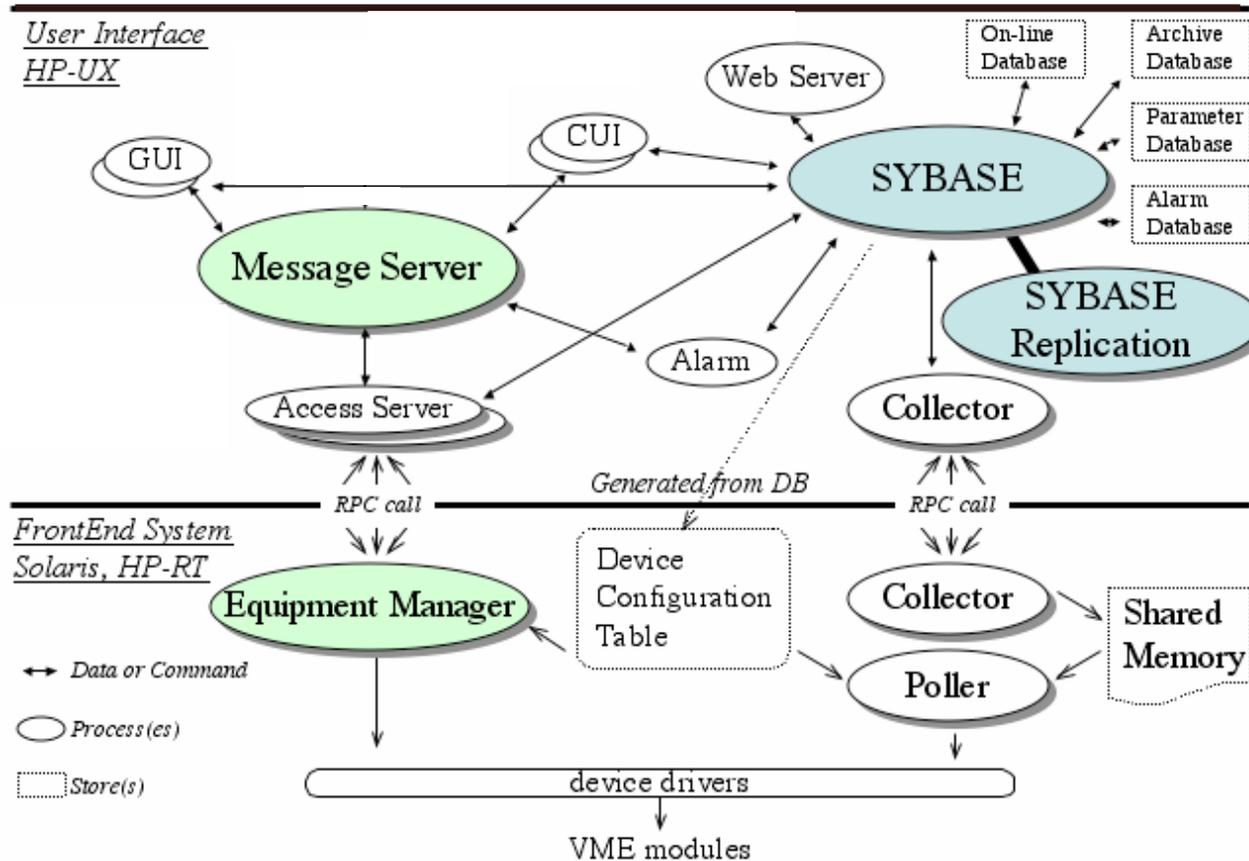
“MADOCA”(□) means

Spiritual enlightenment in  
Japanese.

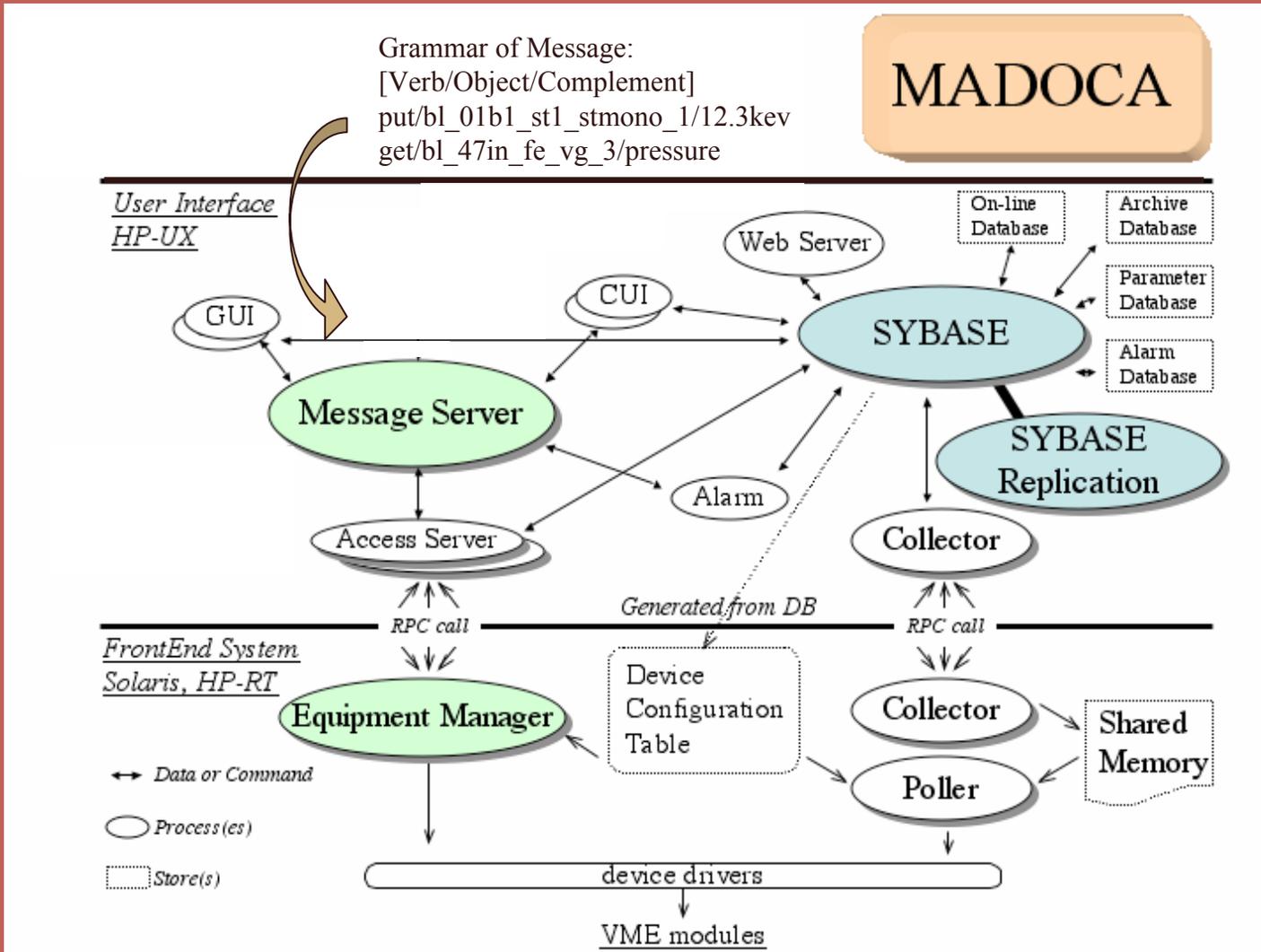


# Software Framework

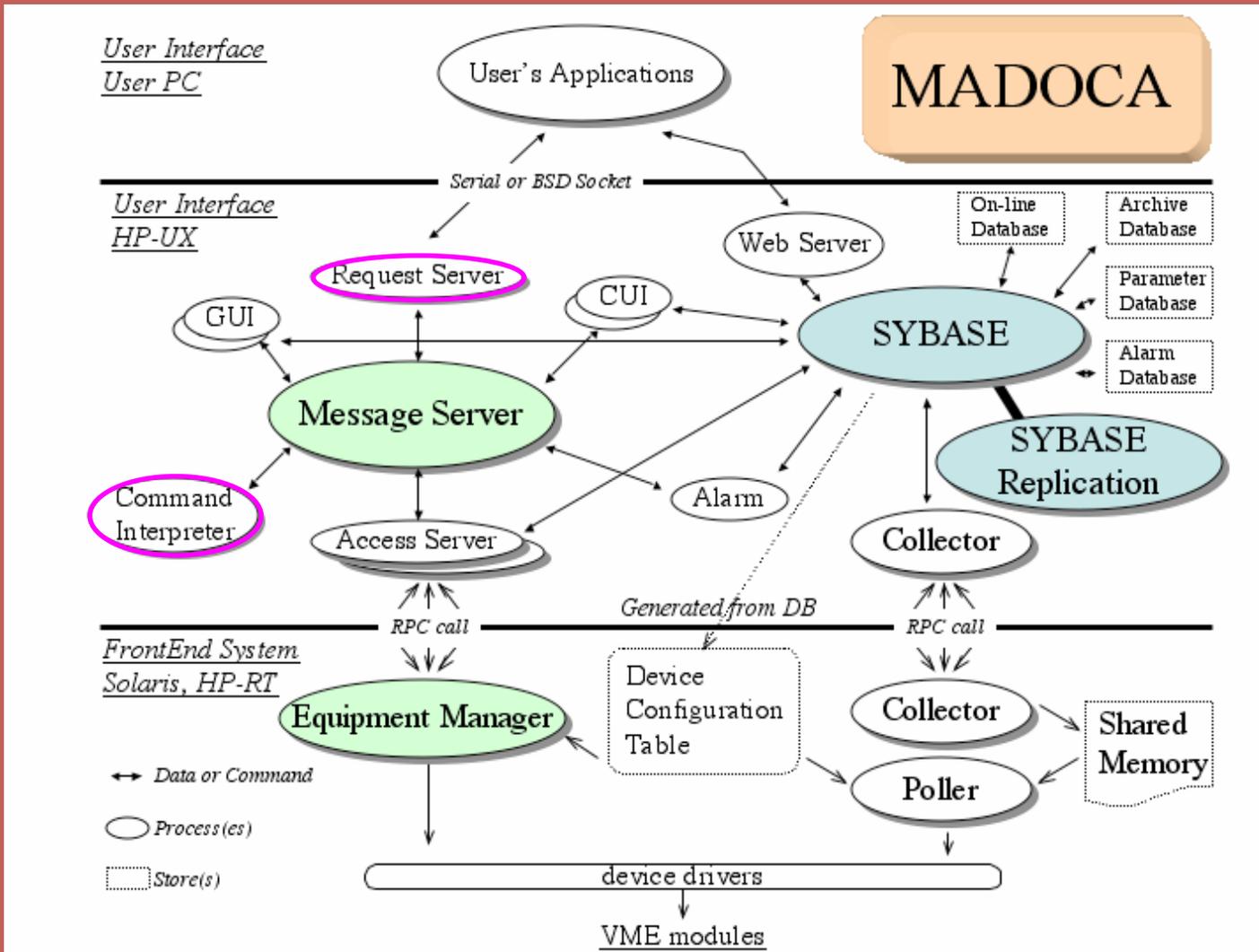
## MADOCA



# Software Framework



# Software Framework



# Computers

## Workstation as user interface

-  HP9000 B2000, B2600/HP-UX 11.00

## Controller as front-end of device

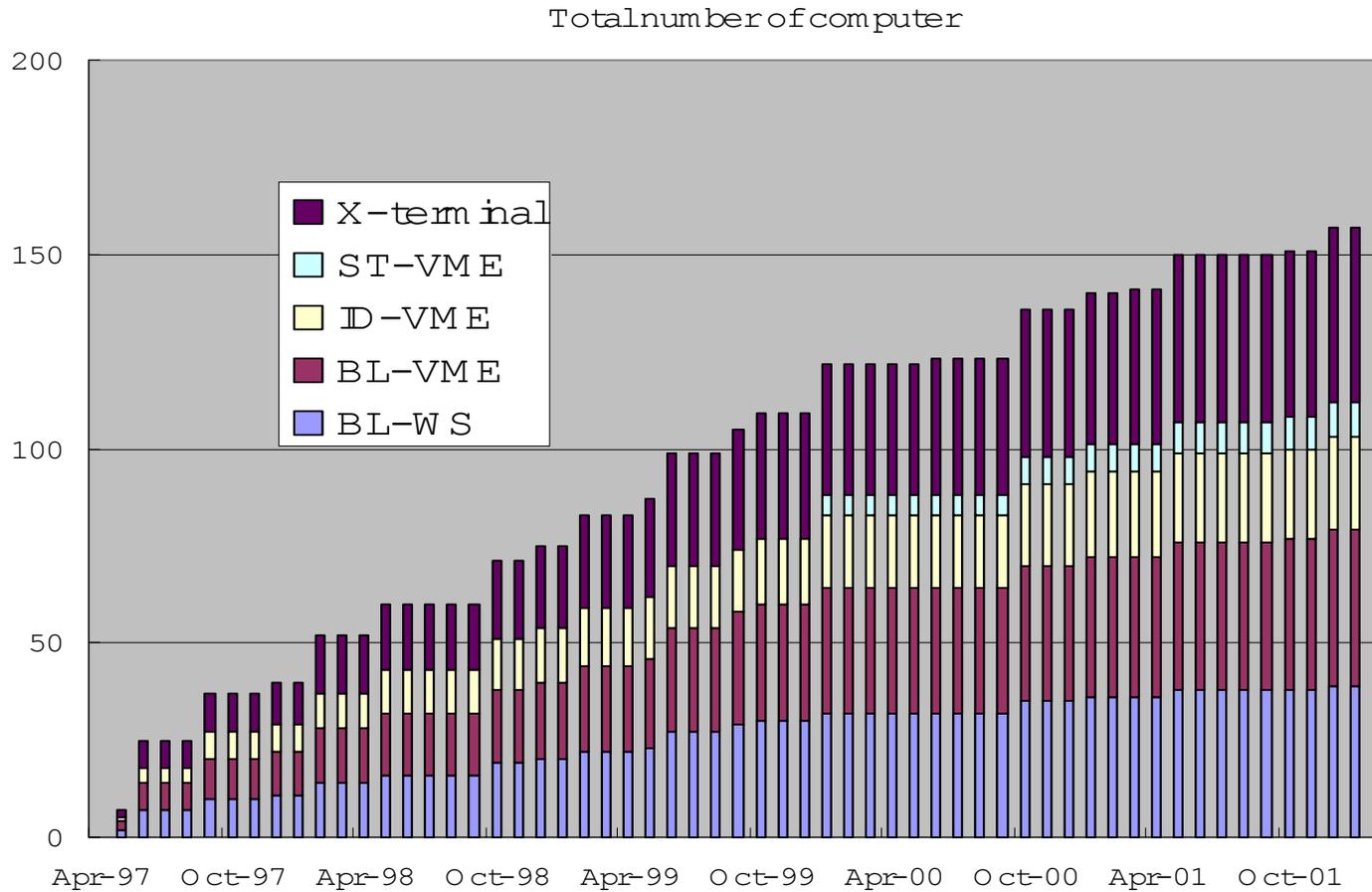
-  HP9000 743rt/HP-RT 2.21
-  Advanet Advme8001/Solaris 8
-  PC compatible/Linux(RedHat 7.3)

## X-terminals

-  PC compatible/FreeBSD 4.7-stable
-  HP9000 B180L/HP-UX 11.0



# A change of the total number of computers



# Amount of ...

## ■ Number of distributed hosts

■ WS  $\approx 50$

■ VME  $\approx 70$

■ X-terminal  $\approx 60$

■ VME for Exp. Station  $\approx 10$

## ■ # of object for data collection

■ Only beamline control  $\approx 7000$

# Expand to...

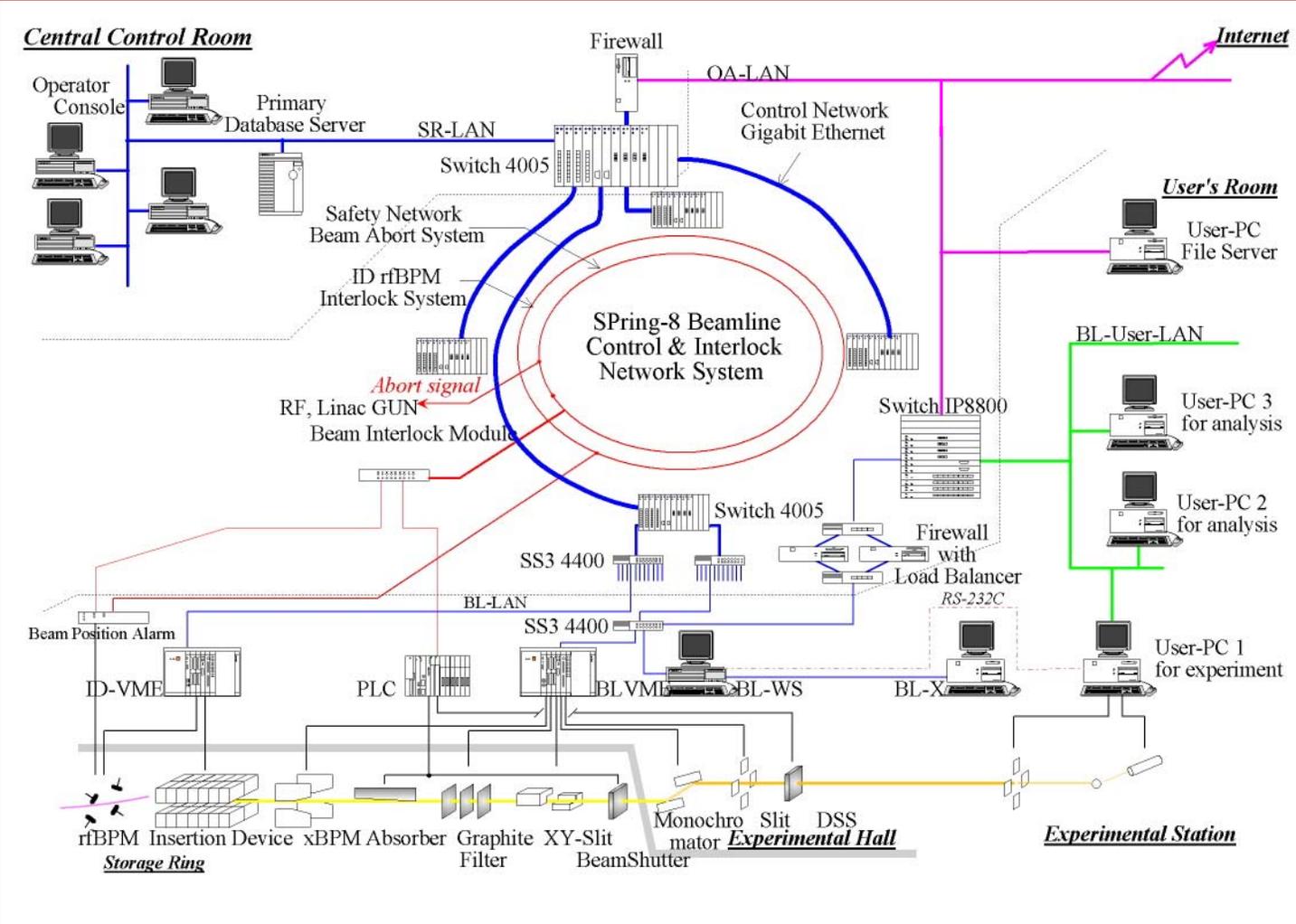
## Beamline Experimental Station

-  BL09IN, BL12IN, BL12B2, BL13IN, BL17IN, BL19IN, BL23IN, BL26B1, BL26B2, BL29IN, BL32B2, BL35IN, BL38B1, BL46IN
-  Mainly for data acquisition system

# Expand to...

- HiSOR (Hiroshima Synchrotron Radiation Center)
  - From Dec.2002 (kickoff meeting)
  - Completion Schedule: in this Summer
  - 150MeV Microtron
  - 700MeV Synchrotron
  - 2 Undulators
  - ~1000 objects
- Construction of the Microtron already finished (in Mar.2003)
  - Actual work persons are 3 with full time

# Overview of network and distributed system



# Reliable and Secure network

## ■ Obstacle detection...

- Network equipment with SNMP
- Watch and monitor by OpenView

## ■ Against conflict...

- Layer-3 Switch with VLAN technology

## ■ Defense...

- Firewall/NAPT between LANs

# Security policy (rules)

FROM	TO	SR(BL)-LAN	BL-USER-LAN	OA-LAN
SR(BL)-LAN			X	X
BL-USER-LAN		$\Delta^*$		O
OA-LAN		X	X	

SR(BL)-LAN: for SPring-8 Control System

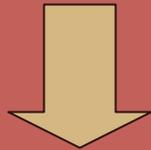
BL-USER-LAN: for Station Control

OA-LAN: for OA

\*Only the client registered into the firewall on BL-USER-LAN can access to the server workstation on SR(BL)-LAN.

# Concepts

- **Easy** to imagine
- Take **ALL** information from **ANY** terminals
- **SYNTHESIS** of interlocks and device controls
- **highly maintainability**
- 
- Based on **RELIABLE** and **SECURE** network
- **FREE** and **INDEPENDENT** ID gap tuning by user
- GUI-based, **unified look & feel**



REACHED



# New topic

## High speed data acquisition

-  Synchronized control
  -  Shared memory network
-  High realtime control
  -  Multi-master configuration on VMEbus

## High functional equipment support

-  Network attached equipment
  -  Oscilloscope, multi-channel analyzer, etc.
-  Software based equipment
  -  LabView, VEE, etc.

# WARCS

## Wide Area Remote Control System

### Trouble

-  Detection, Notification and Fix

### Experiment

-  Automation

### Scope

-  Wireless-LAN, PDA, handy phone, etc.
-  Motion picture Streaming

### Development

-  Authentication and access control
-  Etc.



TNG

# Maintenance cost





# Supported devices (1)

## DIO

HIMV-602A

## DI

Advme1208

Advme1209A

## AI

Advme2602

VMIVME-3122

## AO

Advme2701

Advme2702

Advme2703

## GPIB

Advme1543

EVME-GPIB21

# Supported devices (2)

## PMC

Advme2005

## COUNTER

Advme1805

Advme1806

## ENC. COUNTER

IK220

IK320

## SRAM

HIMV-220

HIMV-220B

Advme1107A

## OPT-VME

HIMV-585A

HIMV-731