

Trends in Robotics and Government's View for Standardization

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Today's Agenda

- 1. Introduction of NEDO**
- 2. Trends in Robotics**
- 3. Government's View for Standardization**
- 4. Robot Related Projects In Japan**

1. Introduction of NEDO

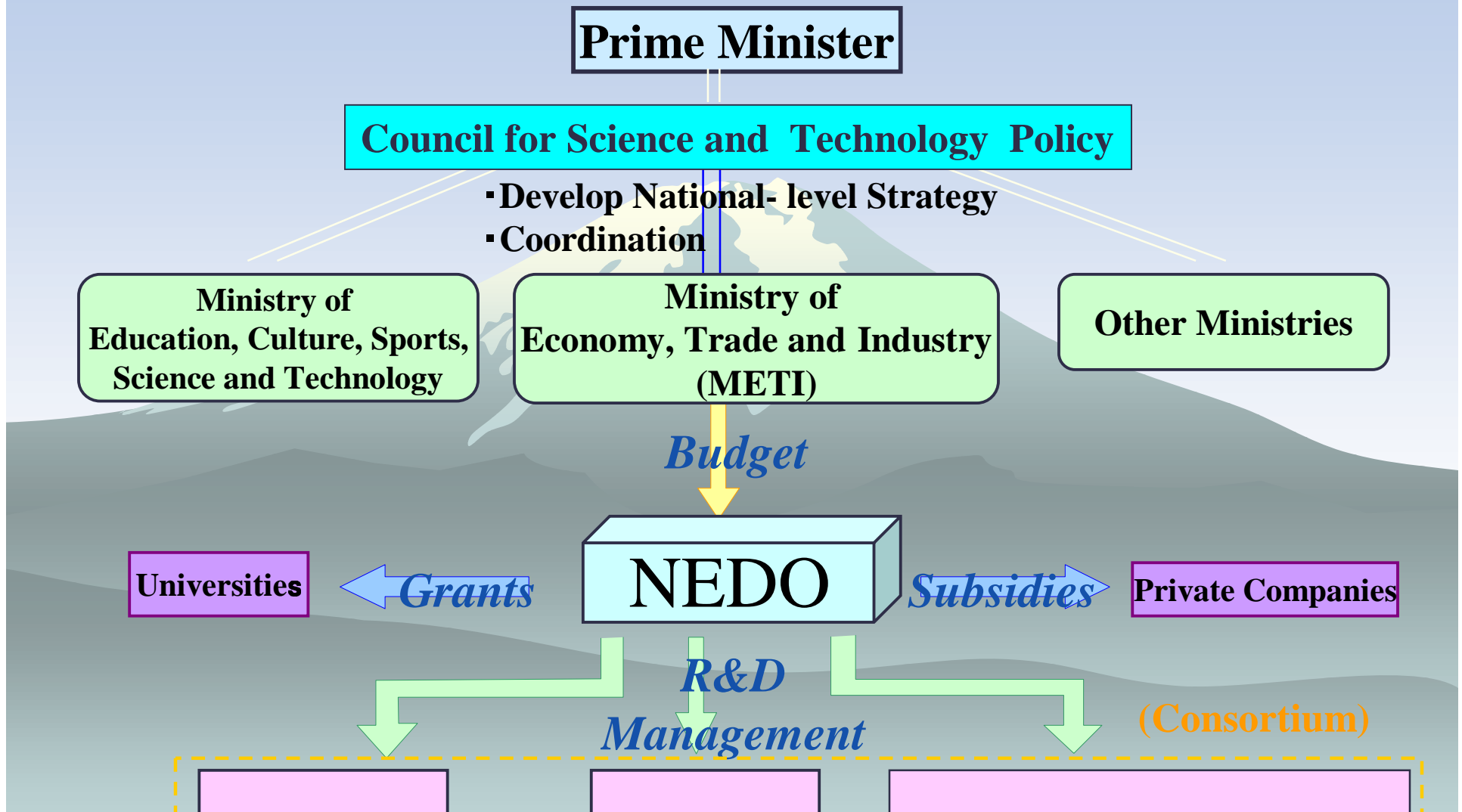
Mission of NEDO

NEDO was established in 1980 and is the largest core organization to promote national level R&D projects in Japan.

- ◆ **Promote R&D to Enhance Japan's Industrial Competitiveness**
- ◆ **Promote New Energy and Energy Conservation to Strengthen Japan's Energy Security and to address Global Environmental Problems**
- ◆ **International Cooperation**

1. Introduction of NEDO

Japan's R&D Promotion Scheme



1. Introduction of NEDO

R&D Expenditures (in FY2003)

(Unit: US\$ million)

	FY 2003
★ Electronics / Information Technology	206
Biotechnology / Medical Technology	182
Nanotechnology / Materials	146
★ Manufacturing /Aerospace/Avionics/Robotics	241
★ Environment / Energy	585
★ Competitive Grants/Subsidy for Private Companies	267

(Exchange Rate=105Yen/US\$)

Total 1,627

2. Trends in Robotics

Trends of Market, Technology and Industry

❖ Market Trend

- Market scale of symbiotic Robots in JAPAN ;US\$1.5 billion in 2010.
(Nakagawa Report;METI 2004 May)
- Near Future,extend its area from welfare/medical,guard,sweeping area to home support area.

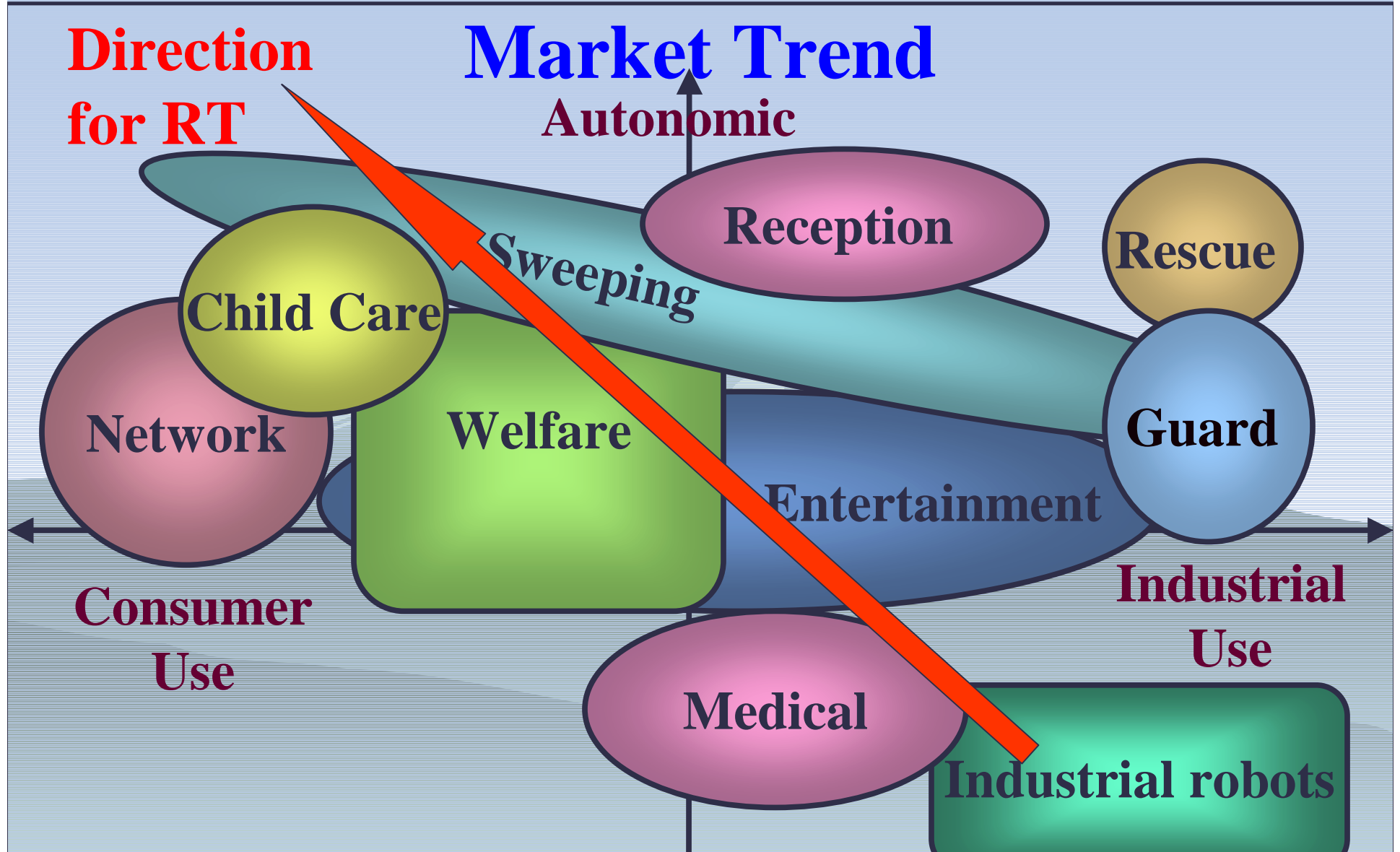
❖ Technology Trend

- Mixed Technology(IT,Mechanical,Nanotech)realizes symbiotic RT.
- The sophisticated IT is most important issue.

❖ Industry Trend

- Open policy stimulates various industries to enter the symbiotic RT Market.
- Main Industries to symbiotic Robots will be IT Venders.

2. Trends in Robotics



2. Trends in Robotics

Technology Trend

Industrial robot



symbiotic robot

Sequential control

High speed

No recess

Technical points

- **Positioning accuracy**
- **Handling power**
- **Multiple axis**
- **Speed**
- **Control performance**

Intellectual machine

Autonomic

Recognize human redundancy

Technical points

- **Autonomic action(learning)**
- **Speech recognition(conversation)**
- **Image recognition(biometrics)**
- **Space recognition(3D)**
- **Sensors (tactile sense, pressure, acceleration, infrared rays)**
- **Network protocol**

2. Trends in Robotics

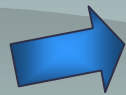
Industry Trend

- ◆ Open and module policy
 - ❖ RT middleware standardization
 - ❖ New industries enter the market through international standardization activities
- ◆ New industries for symbiotic robots

Industrial robots

Standardization

Robot
makers



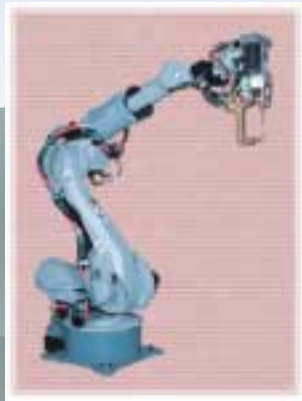
Symbiotic robots

IT vendors
Home electronics makers
Parts makers
(mechanical, IC, sensors)
Software vendors
Toy makers

2. Trends in Robotics

Why have symbiotic robots not been realized?

- No common platform.
- Killer applications are not available.



Present technology



Space
recognition by
sensors

Various killer
applications

Artificial
intelligence

Common platform

Sequence control

Remote control

Application

3. Government's View for Standardization

3-1. Headaches

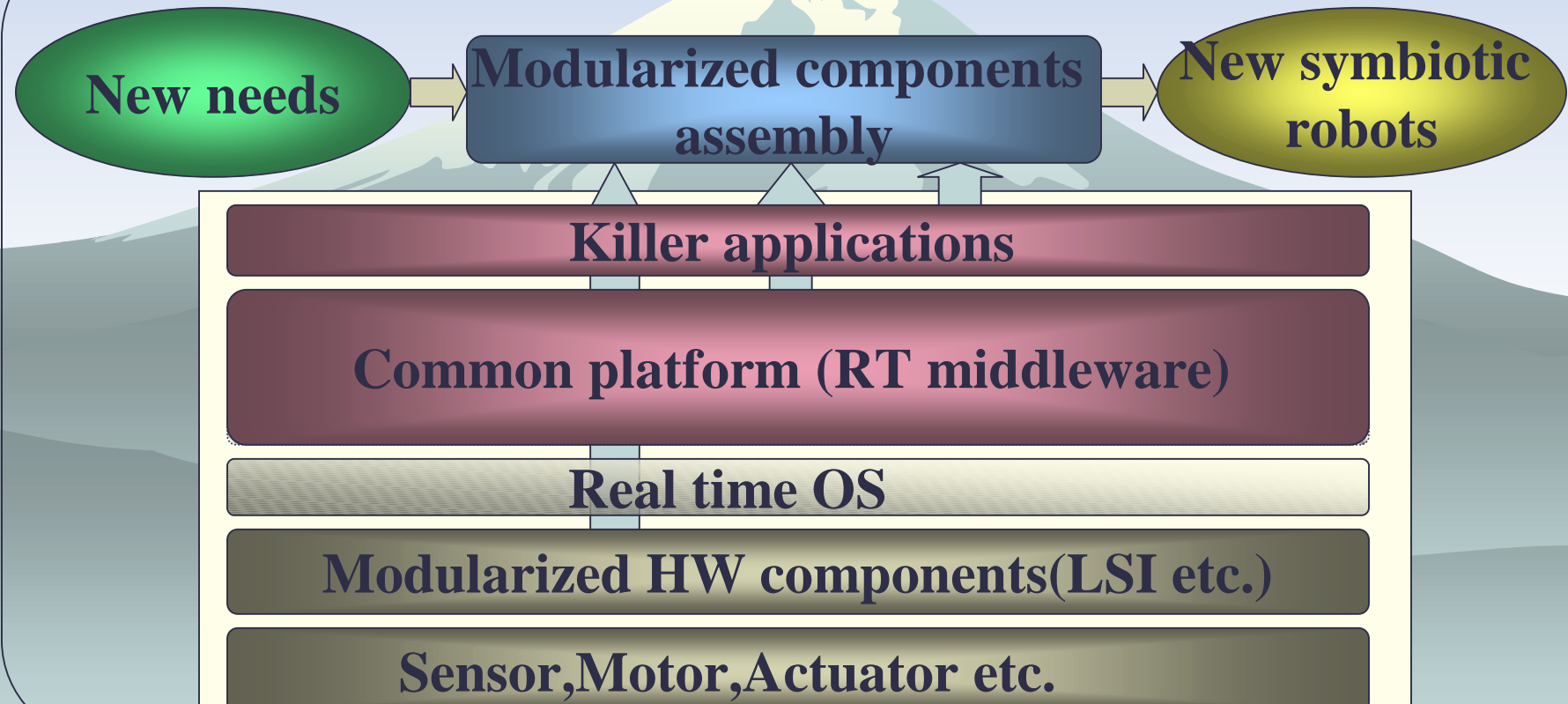
- ◆ Robots have been developed and manufactured using an integrated system, so each manufacturer has a different architecture and there is no common platform.
- ◆ However, a symbiotic robot needs specific and complex application software, and because of the lack of a common platform, software companies cannot afford the cost to develop so many different software and cannot enter the robot market.
- ◆ As a result, companies have no opportunity to attempt any development-related trial and error.

3. Government's View for Standardization

3-2. What should we do?

The assembly-based robot manufacturing should be realized by adapting the modularized methodology (plug-and-play).

Robotics New Market



3. Government's View for Standardization

3-3. Important Elements

In General,

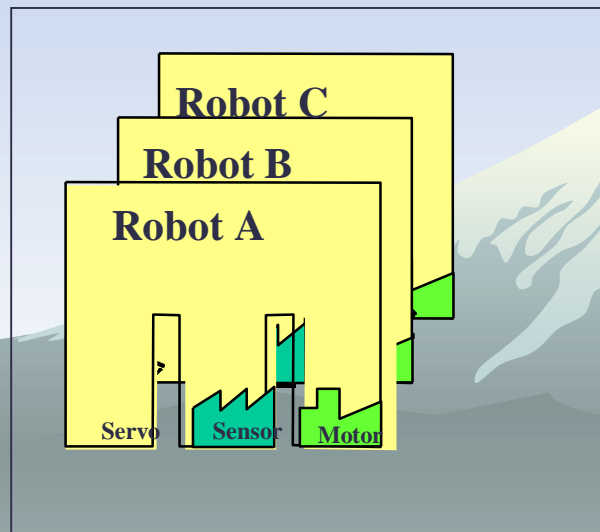
- (1) A common platform is to be established.
- (2) A killer application is to be developed.
- (3) A safe and secure robot is to be realized.
- (4) A new market is to be properly created.

3. Government's View for Standardization

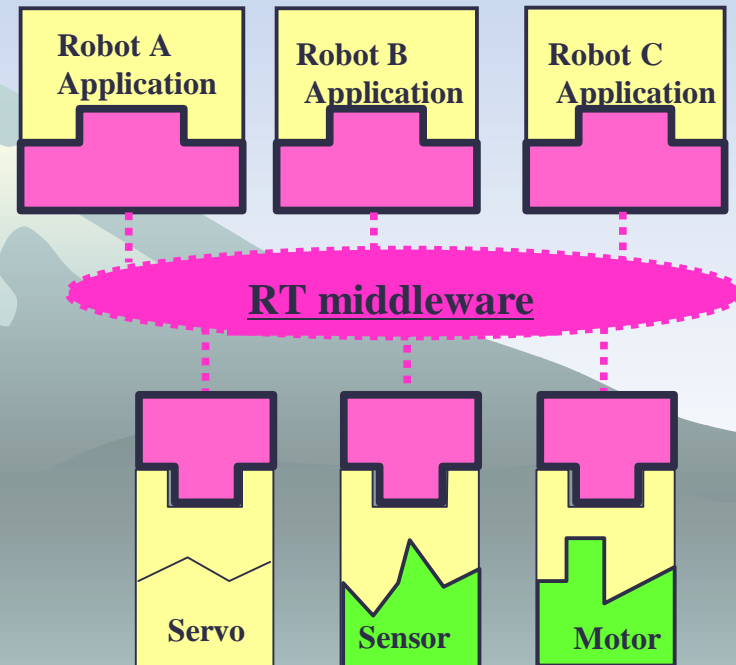
3-4. Issues

(1) A Common Platform

Conventional Robots



Modularized Robots



Concept of RT middleware

- ◆ An Open interface
- ◆ Modularized functional components

3. Government's View for Standardization

(2) A killer application

To create a market for symbiotic robots, a killer application is indispensable.

- ◆ A killer application should be the one that is used by everyone and is able to provide versatile functionality just like a Web browser.
- ◆ A new project to develop symbiotic robots for human welfare and human care is to be started from FY2005.
- ◆ A prototype of killer application is to be developed and tried in this project.

4. Robot Related Projects In Japan

The development projects for next generation practical robots

(To be exhibited in International Exposition 2005 in Aichi Japan)

(1)Term : FY2004-FY2005

(2)Budget : abt. US\$ 30 million

(3)Objectives :

To develop practical type robots which will be in practical use around 2010, and to develop prototype robots which will be in practical use around 2020.

Next Generation Robot Projects (International Expo. 2005 in Aichi Japan)



Practical Robot

【Reception Robot】

Actroid (Advanced Media Co. Ltd., Kokoro Co. Ltd.)



Beautiful lady!!

Practical Robot

【Childcare robot】

PaPeRo (Nihon Electric Co. Ltd.)



**Please come to
Aichi Exposition
and see you!!**

Thank you very much!!

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