

PLCopen OPC UAワーキング

PLCopen Japan

Agenda

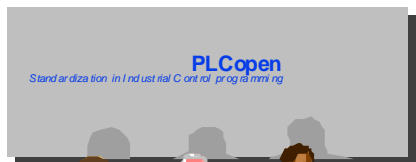
- TC4の活動
- なぜOPC UAと接続するか
- 今まで本部で実施してきたことのご紹介
- 今後の本部での活動計画
- 日本支部の活動計画

T C 4の活動

- 概要



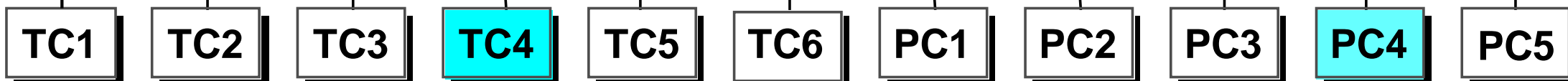
TC4の活動



General Meeting

TECHNICAL (技術委員会)

PROMOTIONAL (普及委員会)



■ FB

■ OPC UA

■ XML

■ Japan



モーション用FBの標準化

OPC UAジョイントWG

PLCプログラムのXML化

規格適合の認証(準備中)他

なぜOPC UAと接続するか

- OPC UA の Story
- Why did OPC UA appear?



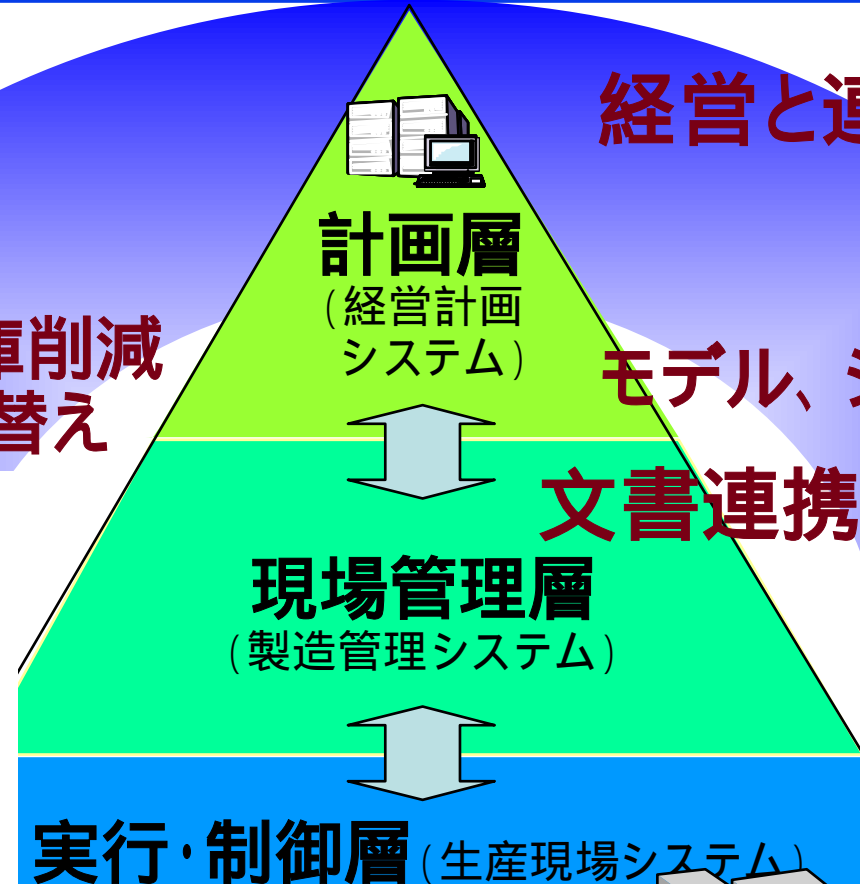
生産現場と情報系が連携

段取り替え
レイアウト替え
品質管理
設備稼働管理
仕がかり品・中間在庫削減
生産プロセスの組み替え

経営と連携した見える化

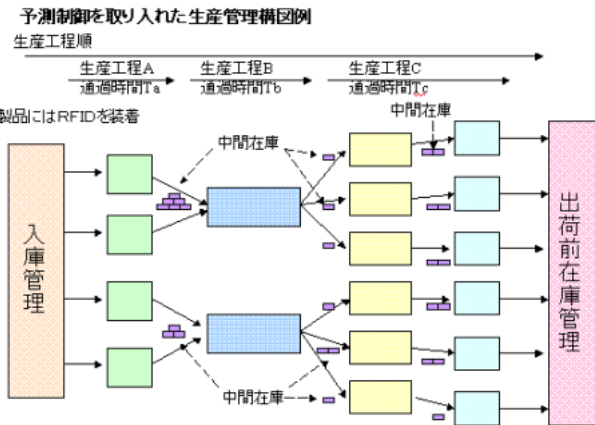
モデル、シミュレーションの活用

見える化
視える化
診える化
看える化
観える化

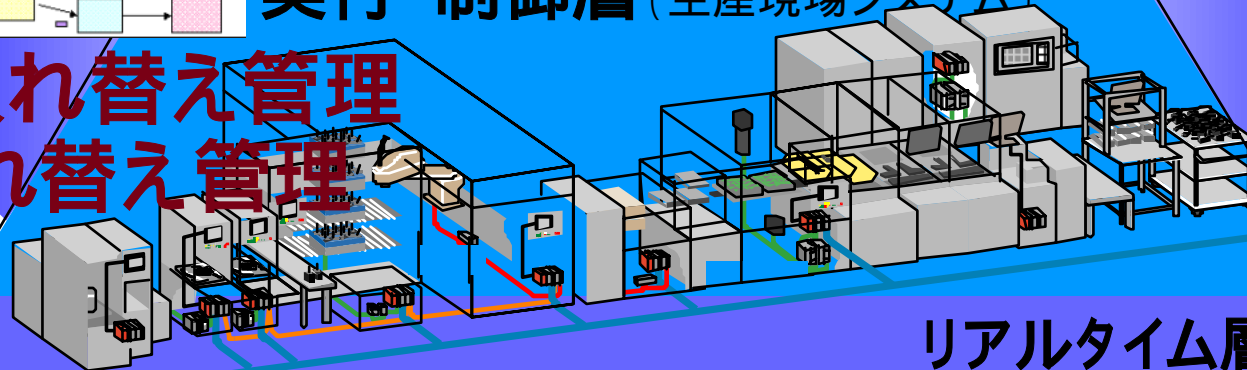


文書連携

実行・制御層 (生産現場システム)

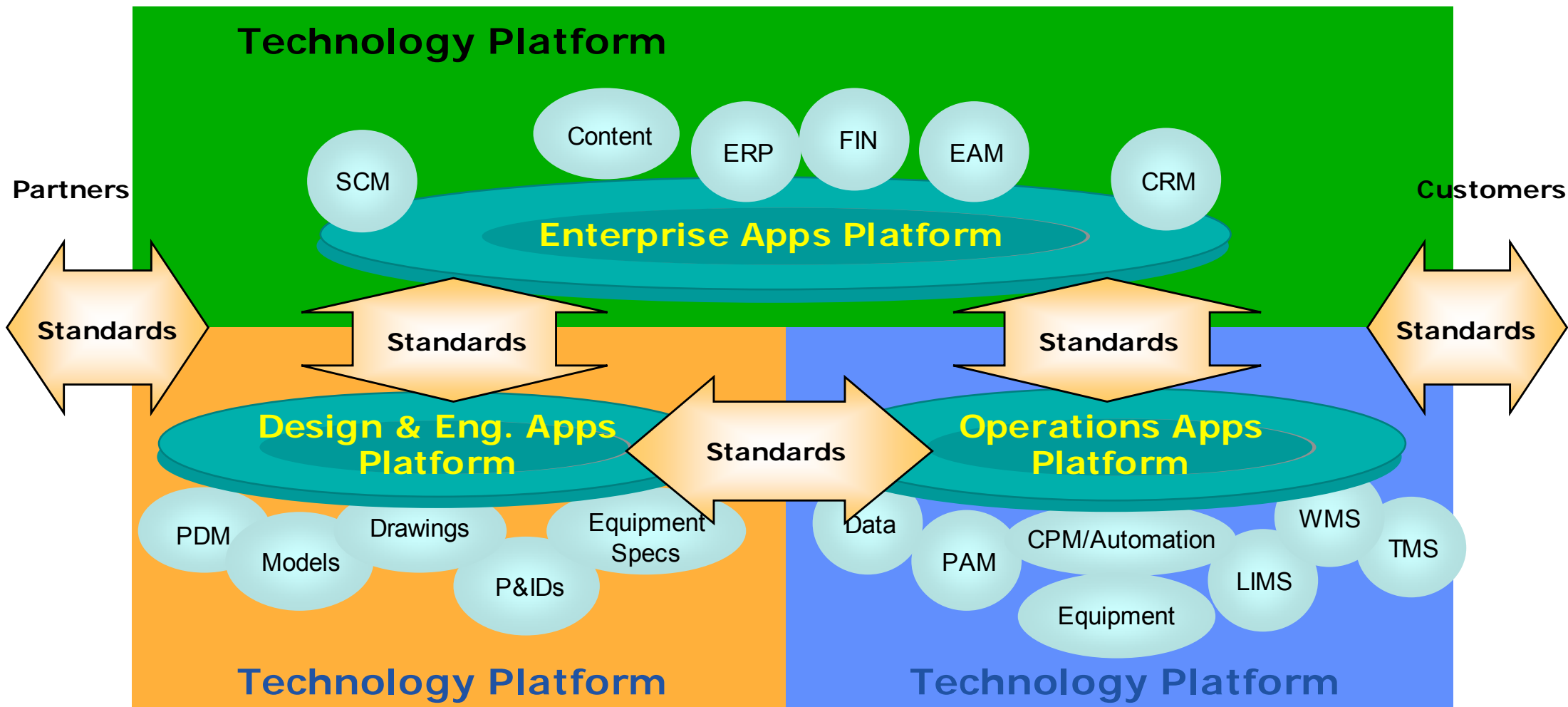


レシピの入れ替え管理
制御の入れ替え管理



リアルタイム層

OPC Unified Architectureの必要性



Industry-Standard

interoperability, Productivity & Collaboration

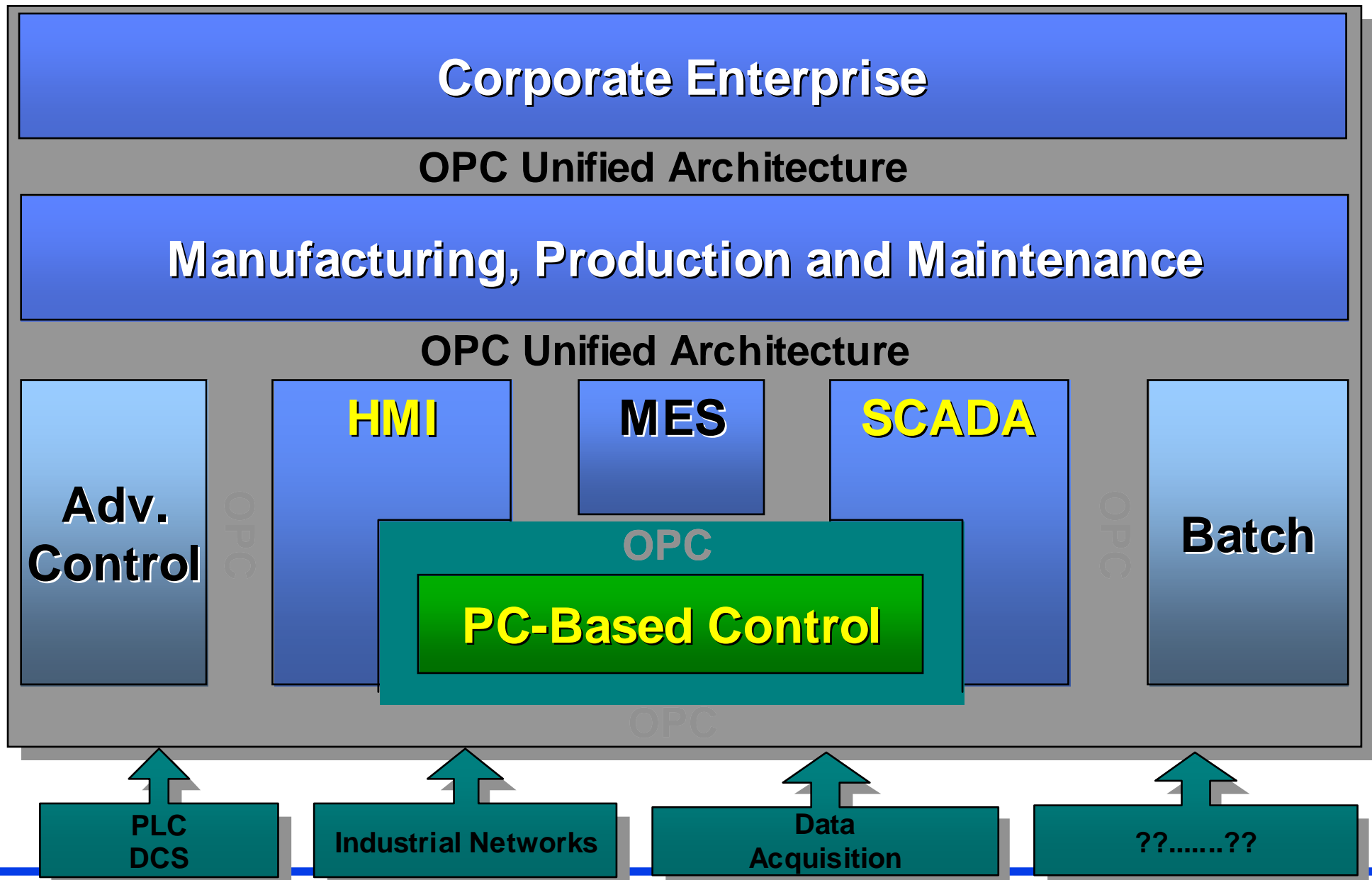


図1 OPC UAに求められていること

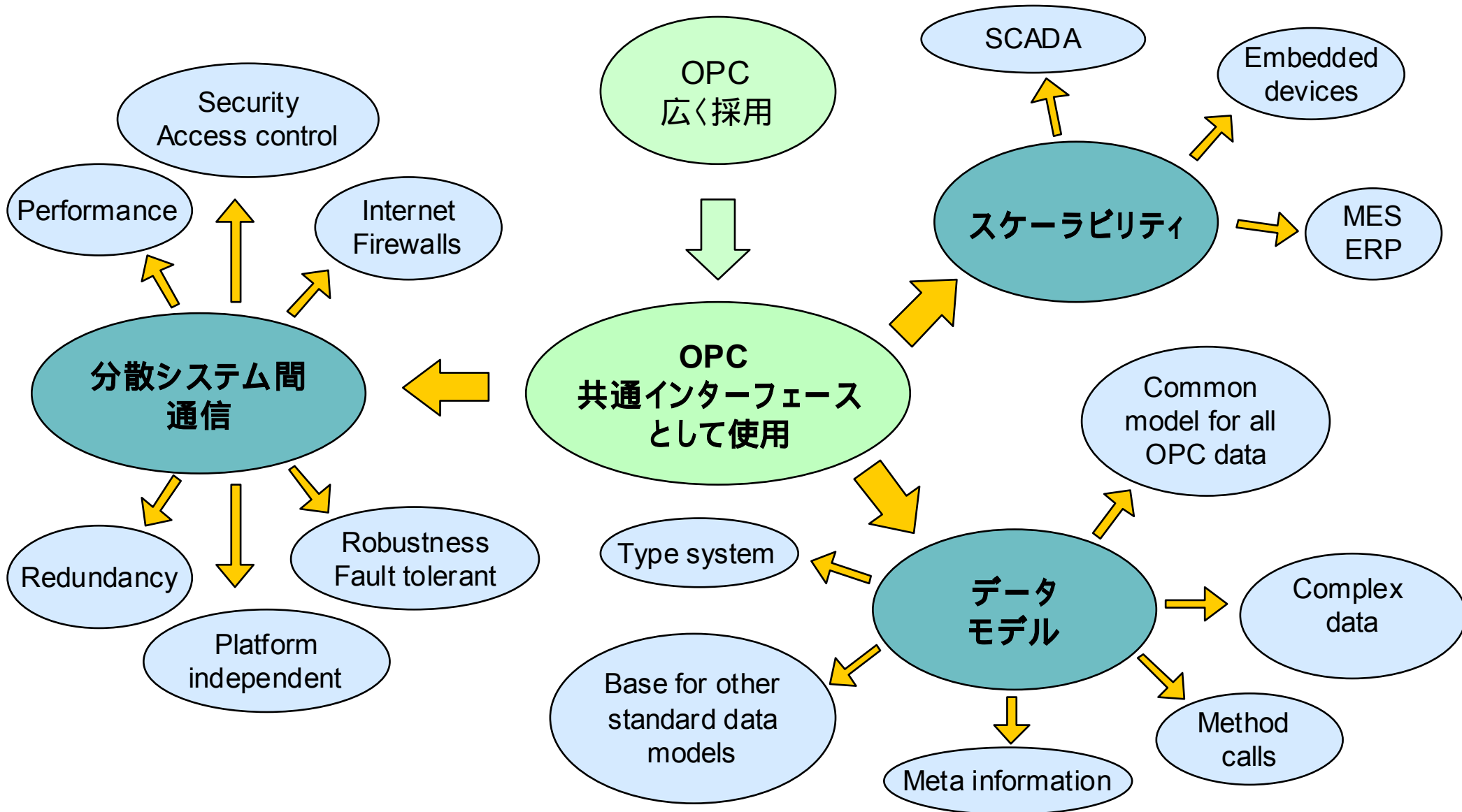


図2 OPC-UA仕様

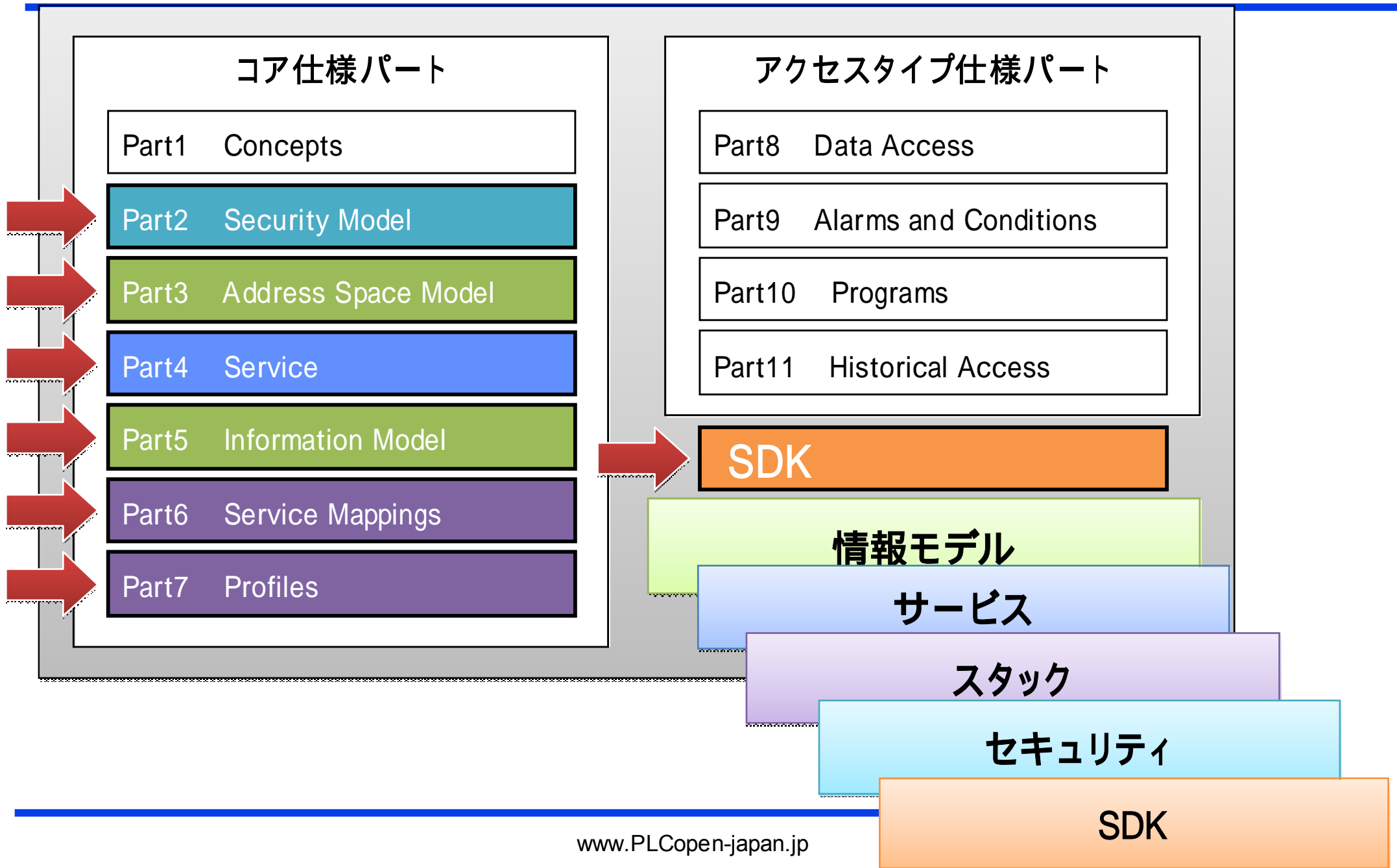
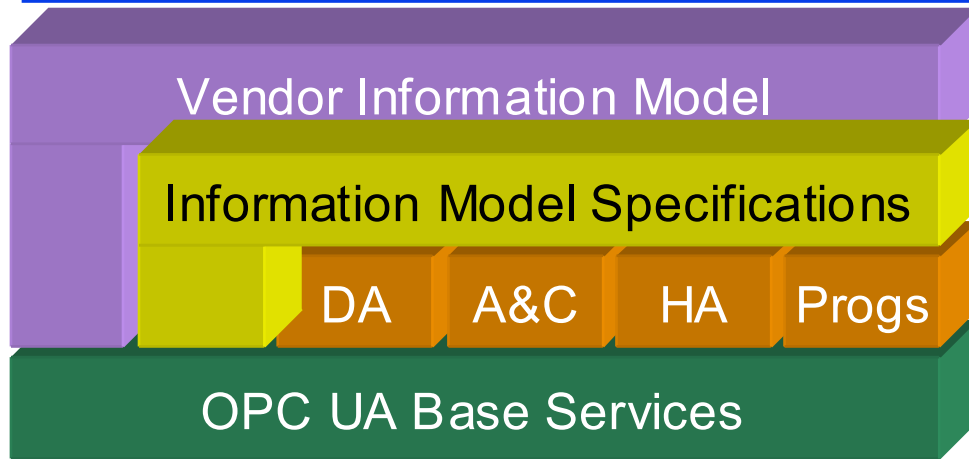


図3 インターフェース・レイヤの構成



UAベースで書かれているクライアントは
すべてのデータにアクセスできる！

← IEC, ISA, MIMOSA ...

← OPC 情報モデル

← 全ての必要なサービス

アドレス空間の概念

情報モデルのアドレス空間

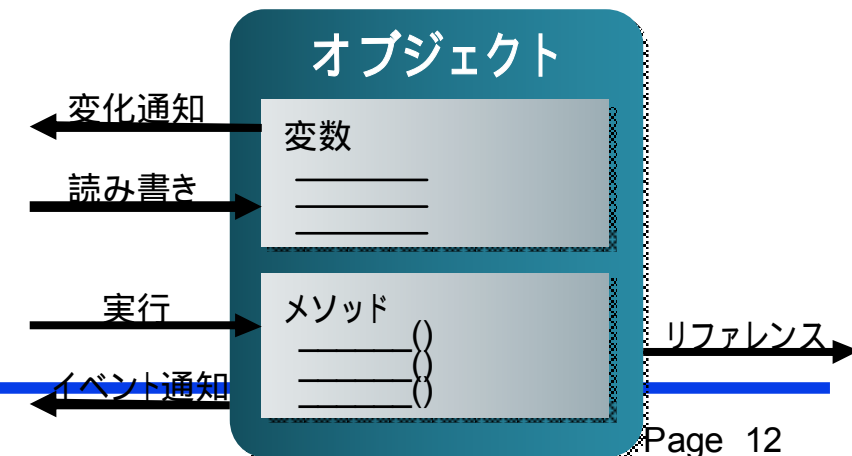
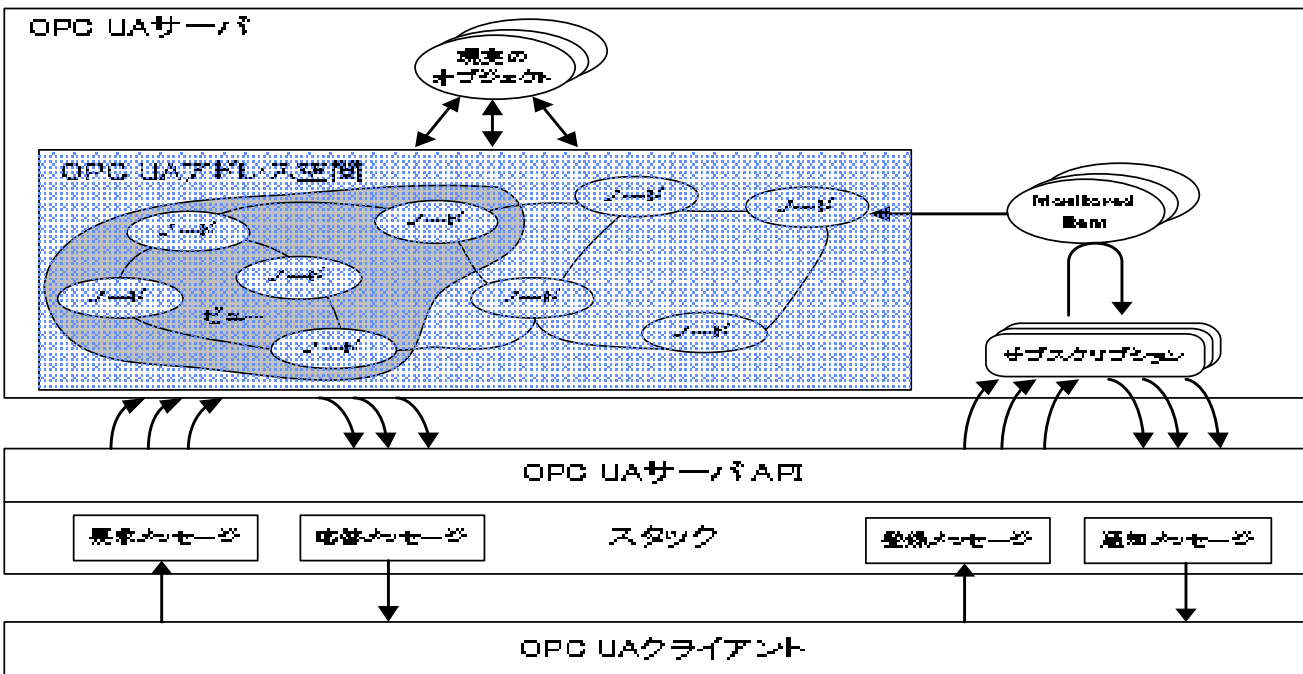
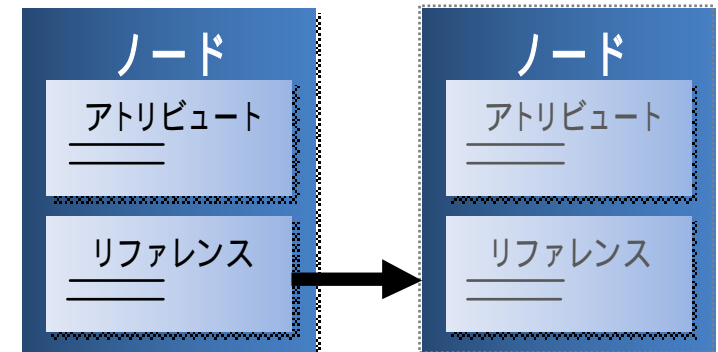


図4 コミュニケーション・レイヤ

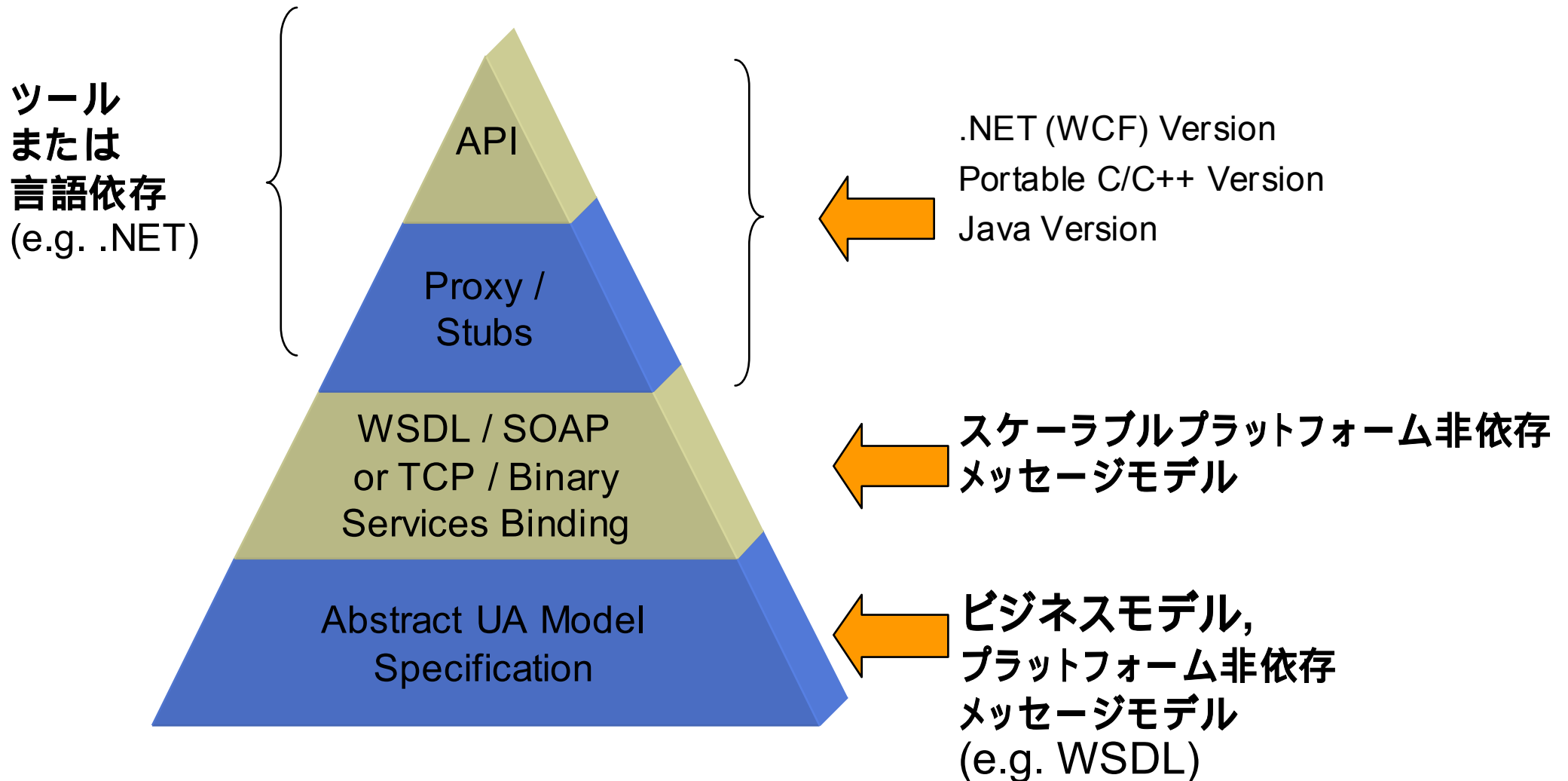


図5 データ伝送

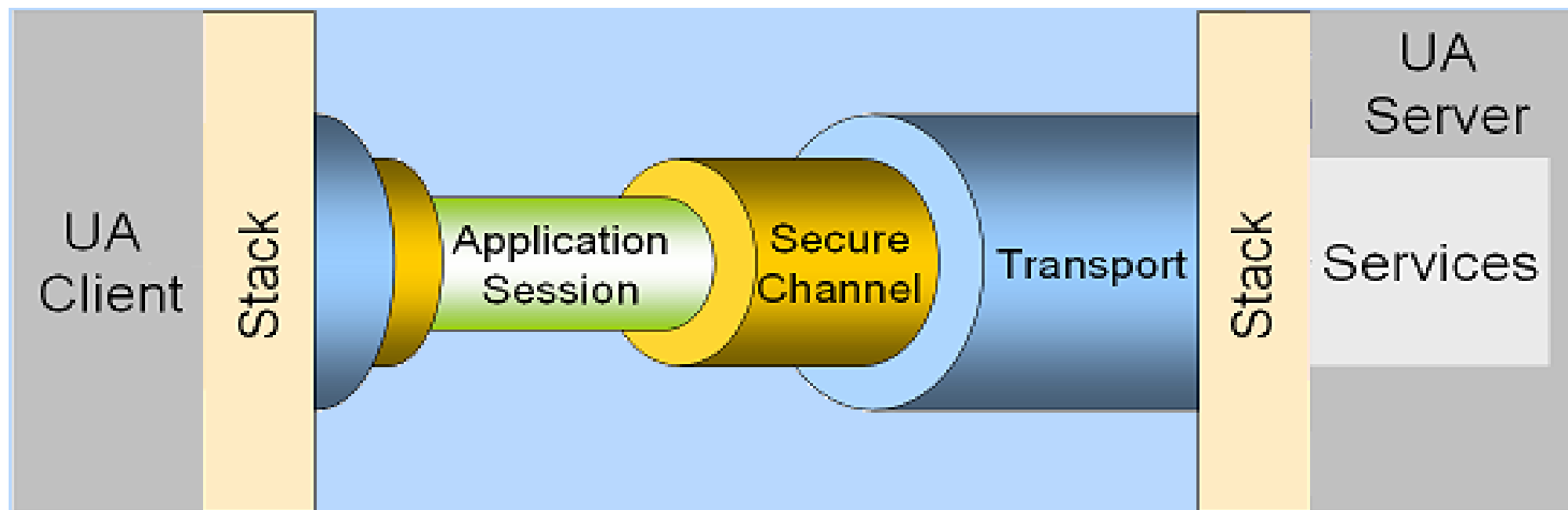


図6 UAオブジェクト・モデル

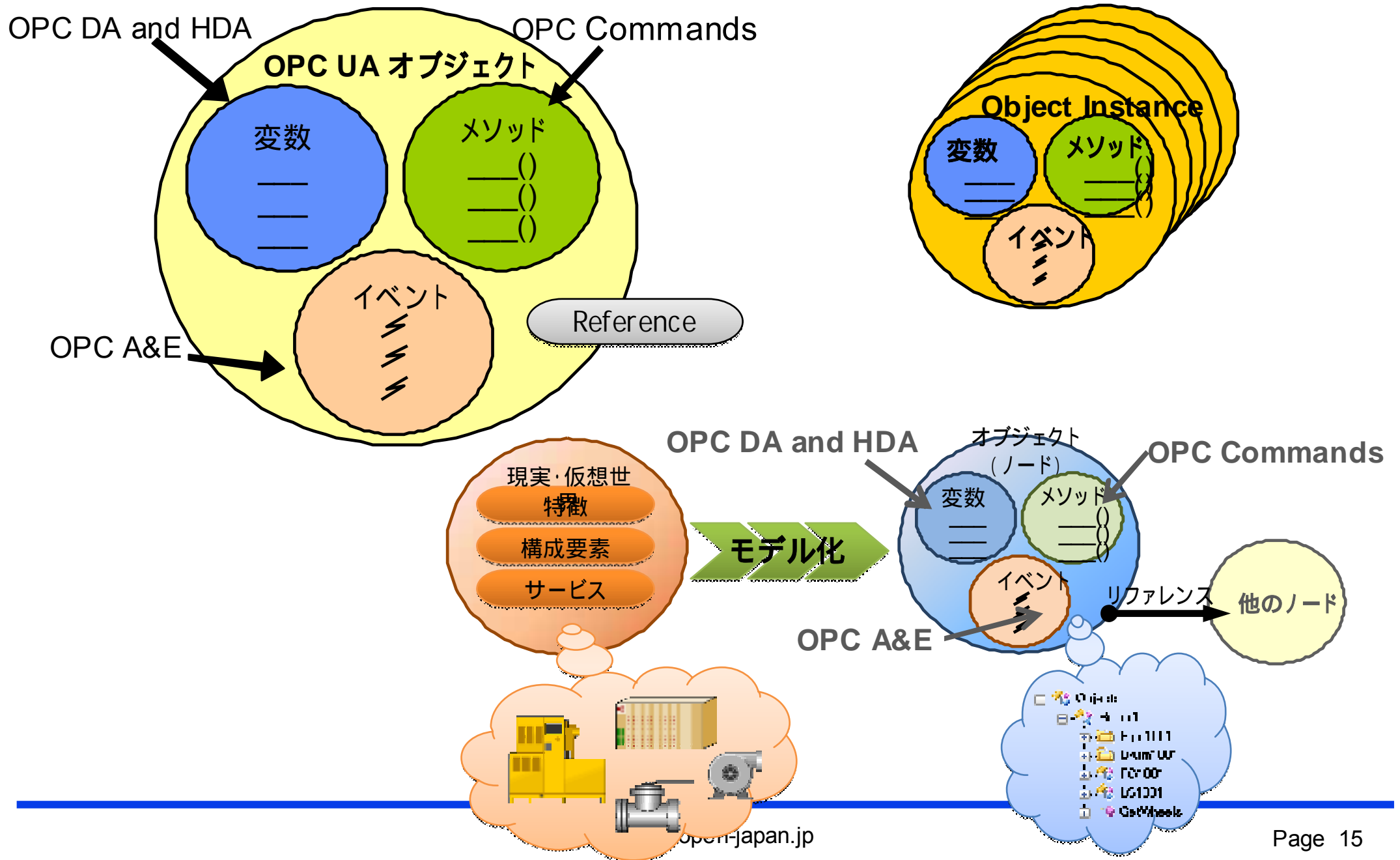
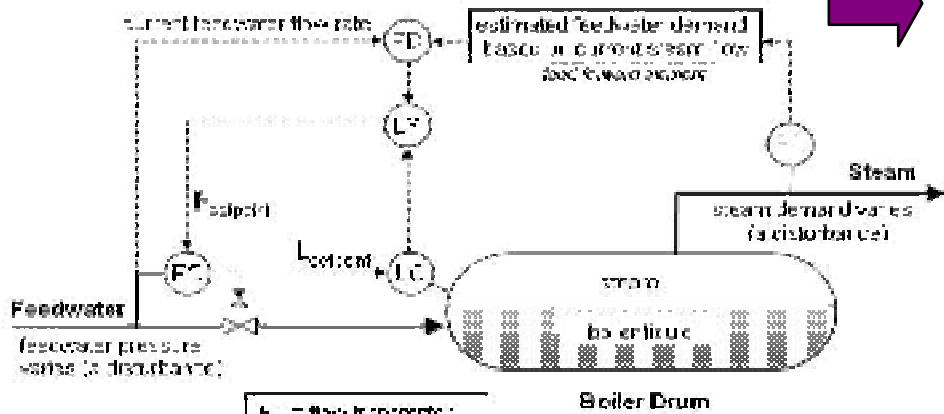


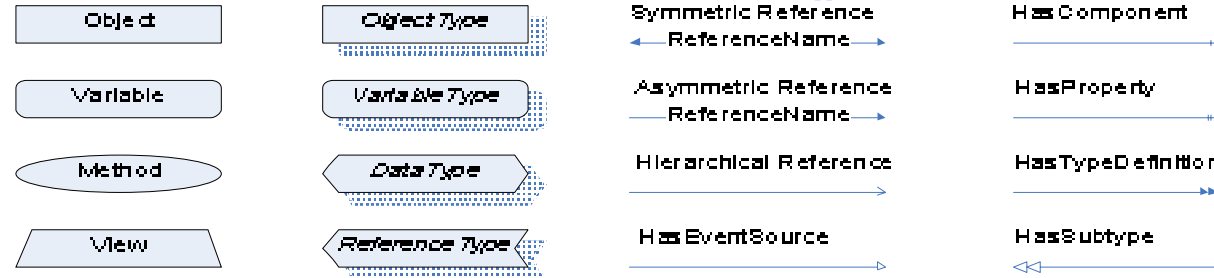
図6-1 UAモデリング事例 - ボイラ制御事例

計装図

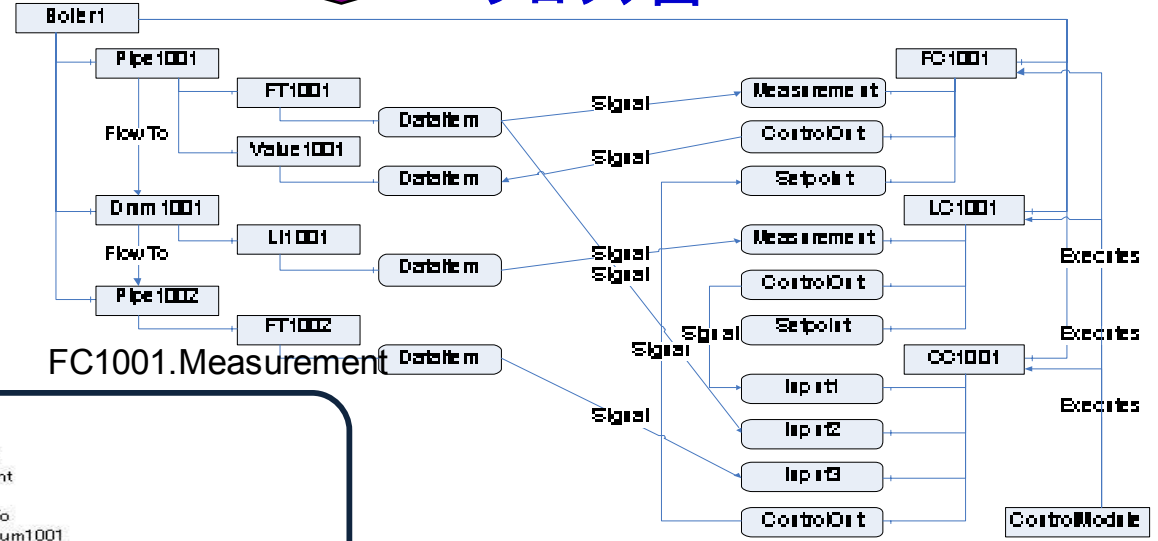


FT = flow transmitter
 FC = flow controller
 LC = level controller
 SP = setpoint
 LV = leveling valve

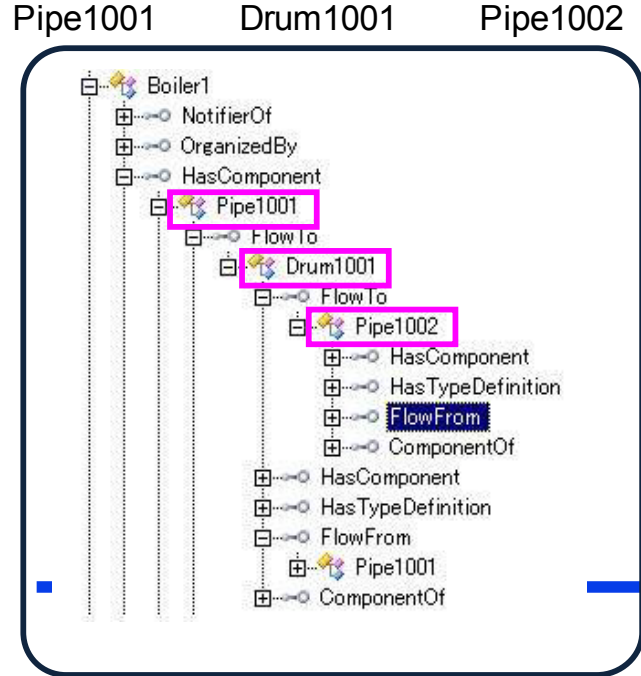
アドレス・スペースの表記



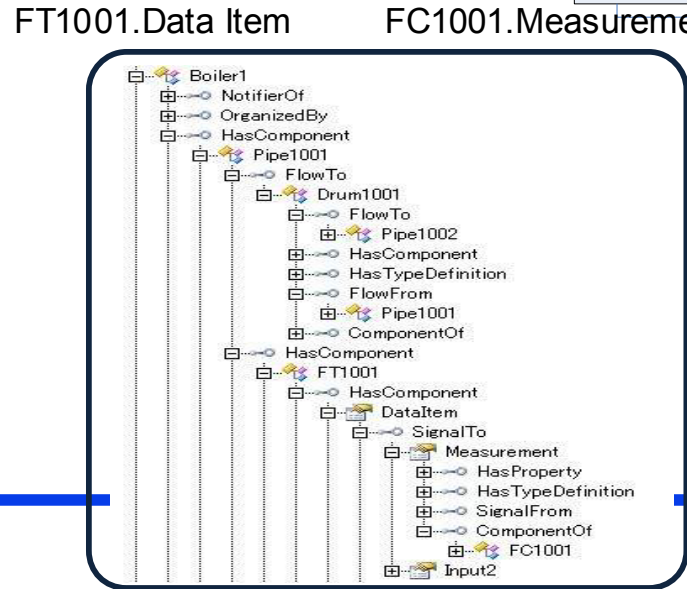
ブロック図



構成要素の関係



データの関係



アドレス空間

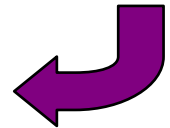
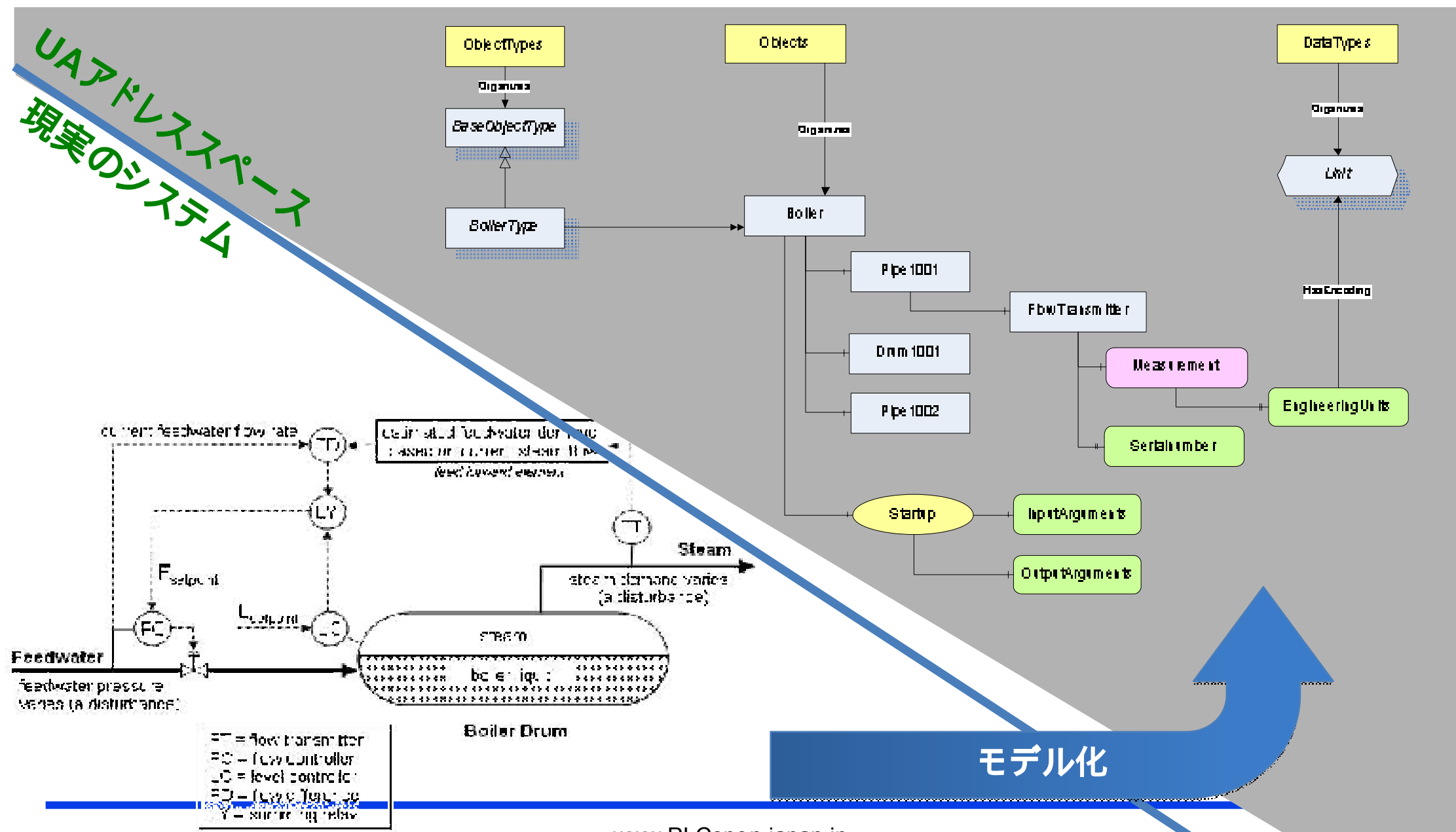


図6-2 UAモデル化事例

UAアドレススペース
現実のシステム



今まで本部で実施してきたことのご紹介

- 概要
- IEC61131-3UAのマッピング例



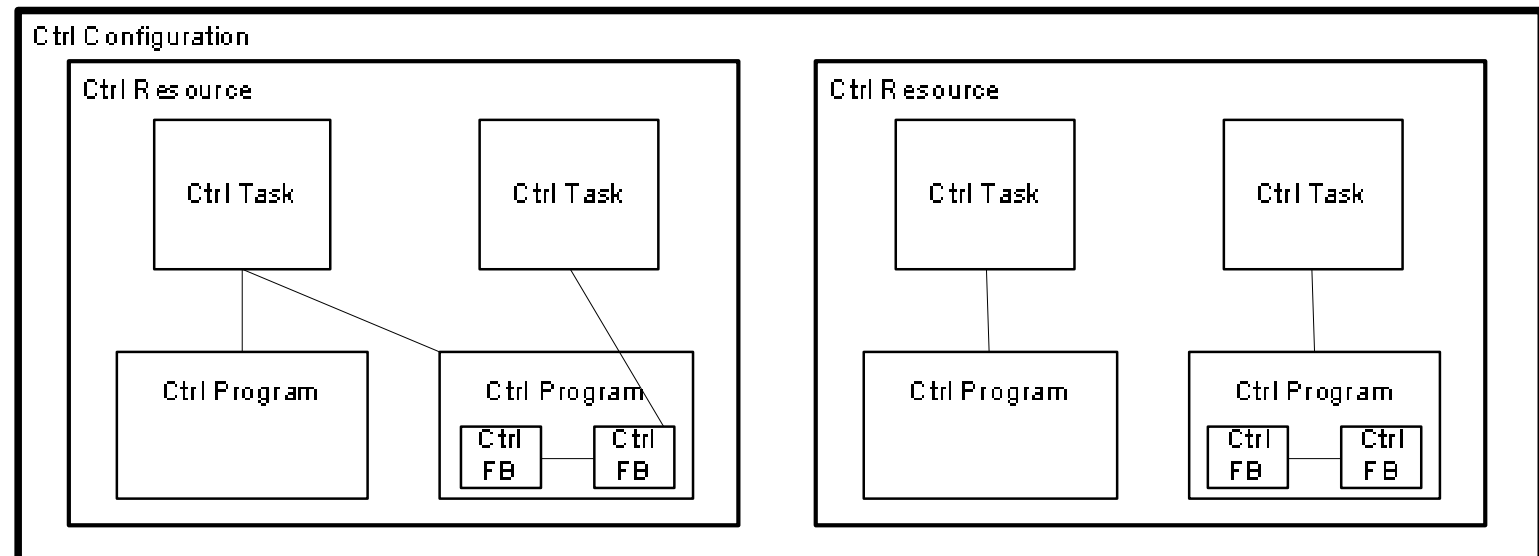
- Standardizes programming languages for industrial automation

産業オートメーションのためにプログラミング言語を標準化

- Describes the Common Elements and Programming Languages

共通の要素について説明して、言語をプログラムする

- Software Model:



```
FUNCTION_BLOCK CTU_INT
```

```
VAR_INPUT  
  CU: BOOL;  
  R:  BOOL;  
  PV: INT;  
END_VAR
```

```
VAR  
  PVmax: INT := 32767;  
END_VAR
```

```
VAR_OUTPUT  
  Q:  BOOL;  
  CV: INT;  
END_VAR
```

```
  IF R THEN  
    CV := 0;  
  ELSIF CU AND (CV < PVmax) THEN  
    CV := CV + 1;  
  END_IF ;  
  Q := (CV >= PV);  
END FUNCTION_BLOCK
```

```
PROGRAM MyTestProgram
```

```
VAR_INPUT  
  Signal:  BOOL;  
  Signal2: BOOL;  
END_VAR
```

```
VAR  
  MyCounter: CTU_INT;  
  MyCounter2: CTU_INT;  
END_VAR
```

```
VAR_TEMP  
  QTemp:  BOOL;  
  CVTemp: INT;  
END_VAR
```

```
  MyCounter(CU := Signal, R := FALSE, PV := 24);
```

```
  QTemp := MyCounter.Q;  
  CVTemp := MyCounter.CV;
```

```
  MyCounter2(CU := Signal2, R := FALSE, PV := 19);
```

```
  QTemp := MyCounter2.Q;  
  CVTemp := MyCounter2.CV;
```

```
END_PROGRAM
```

Use cases for OPC UA mapping

■ Observation

- Reading and monitoring of online data from PLC program
- Type information for rapid engineering
- Data from function blocks and program variables

■ Operation

- Includes Observation
- Writing data from function blocks and program variables

■ Engineering

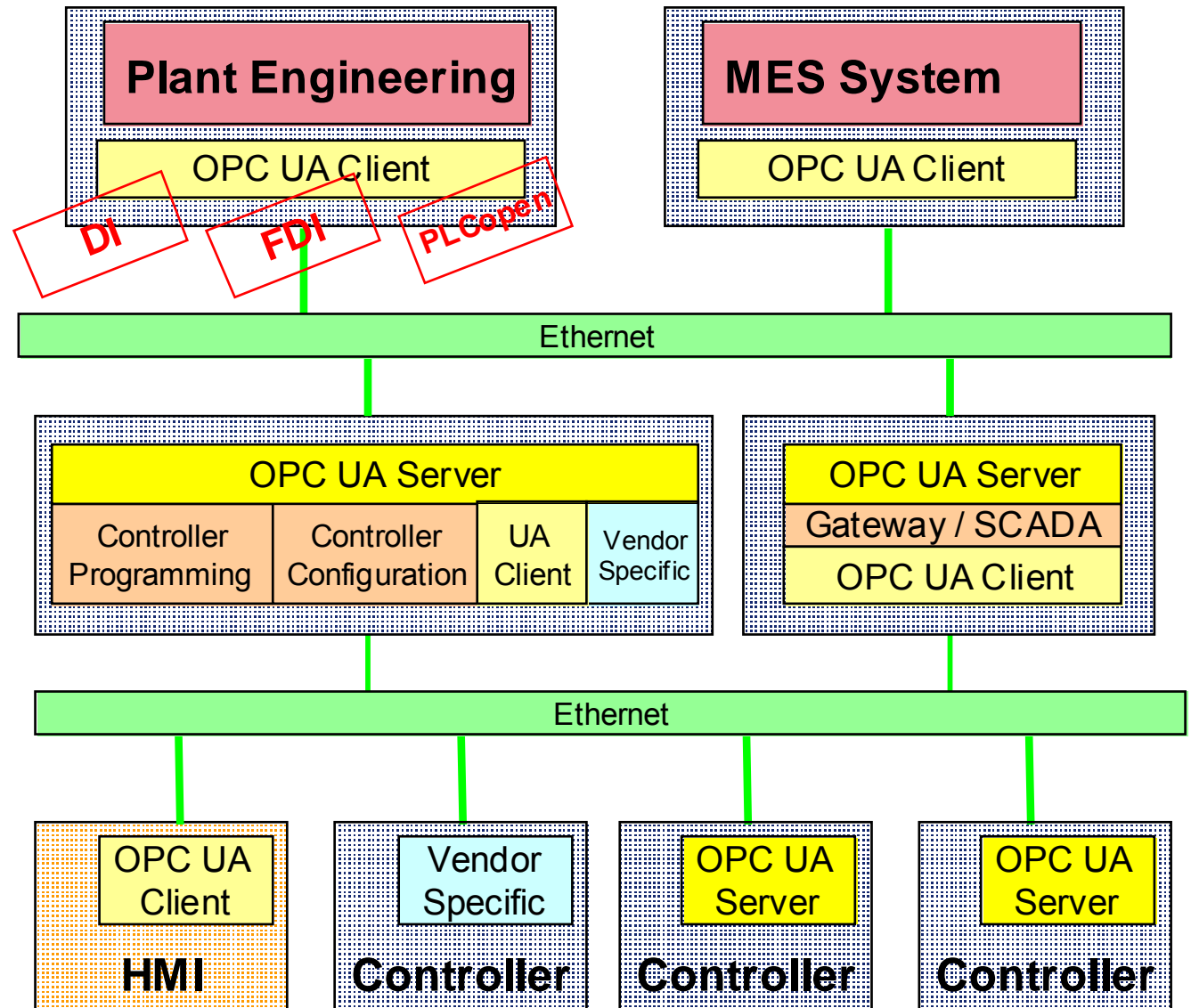
- Includes Observation
- Modification of programs and configurations
- Download of programs and configurations

■ Service

- Includes Engineering
- Reading writing of special configuration data like firmware updates

System Architecture PLCopen

- ▶ Enterprise systems
 - ▶ Plant engineering
 - ▶ Asset management
- ▶ PC bases Systems
 - PLC Programming Tools – access to configuration
 - SCADA
- ▶ Embedded Devices
 - Access to FB and Variables
 - RTOS



- **Started in December 2008**

- **Meetings**
 - Three Face to Face meetings
 - Eight phone conferences / web meetings

- **Specification**
 - Information model stable after release of DI (Device Integration)
 - Release candidate finished
 - Review process started in both organizations (PLCopen / OPC)
 - Release planned for March 2010

- **Implementation / Adoption**
 - Evaluation implementations are started
 - Successful demo at SPS/IPC/Drives show in Nuremberg (11/2009)

- **Demo at SPS/IPC/Drives show November 2009**
 - **HMI / SCADA as OPC UA client**
 - **Allmendinger – OPC UA Client Channel for SIMATIC WinCC**
 - **Certec – atvise**
 - **ICONICS – Genesis 64**
 - **INOSOFT – VisiWinNET**
 - **OPC UA servers**
 - **Beckhoff – Embedded into controller**
 - **ifak – PC based**
 - **KW Software / Phoenix Contact – Embedded into controller**
 - **logi.cals / HIMA – Embedded into controller**
 - **Unified Automation – Offline server loading address space from XML export**
- **Plug fest for demo preparation October 2009**
 - **Six Servers / five for embedded use**
 - **3S/Codesys, Beckhoff, Bosch Rexroth, ifak, KW Software, logi.cals**
 - **Two clients – Certec and ICONICS**

今後の本部での活動計画

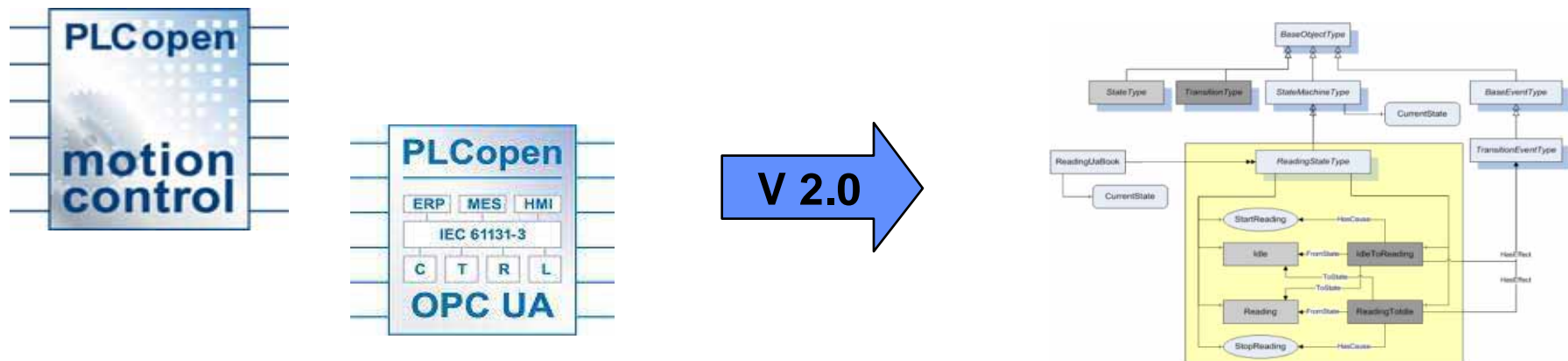
- Introduction and Status IEC 61131-3 UA mapping



Scope joined working group

► Scope for additional standardization PLCopen and OPC

- Focus on additional features
- Mapping of Sequential Function Charts (SFC)
- Standard UA communication function blocks for PLC to PLC communication
- Standard function blocks for Alarm handling and mapping to OPC UA Alarms and Conditions
- Best practice guidelines for OPC UA concepts like Methods, Events, Historical Access and Programs



日本支部の今後の活動計画

- PLCopen IEC61131-3からOPC UAの情報モデルへ変換する方法の解説書(ガイドライン)をOPC-Jと協力して解析。
- MOF2010で経過発表。
- PLCopen本部とOPC-Fの活動情報をリサーチし、会員に報告

