

SEMI EDA Specifications

An Overview

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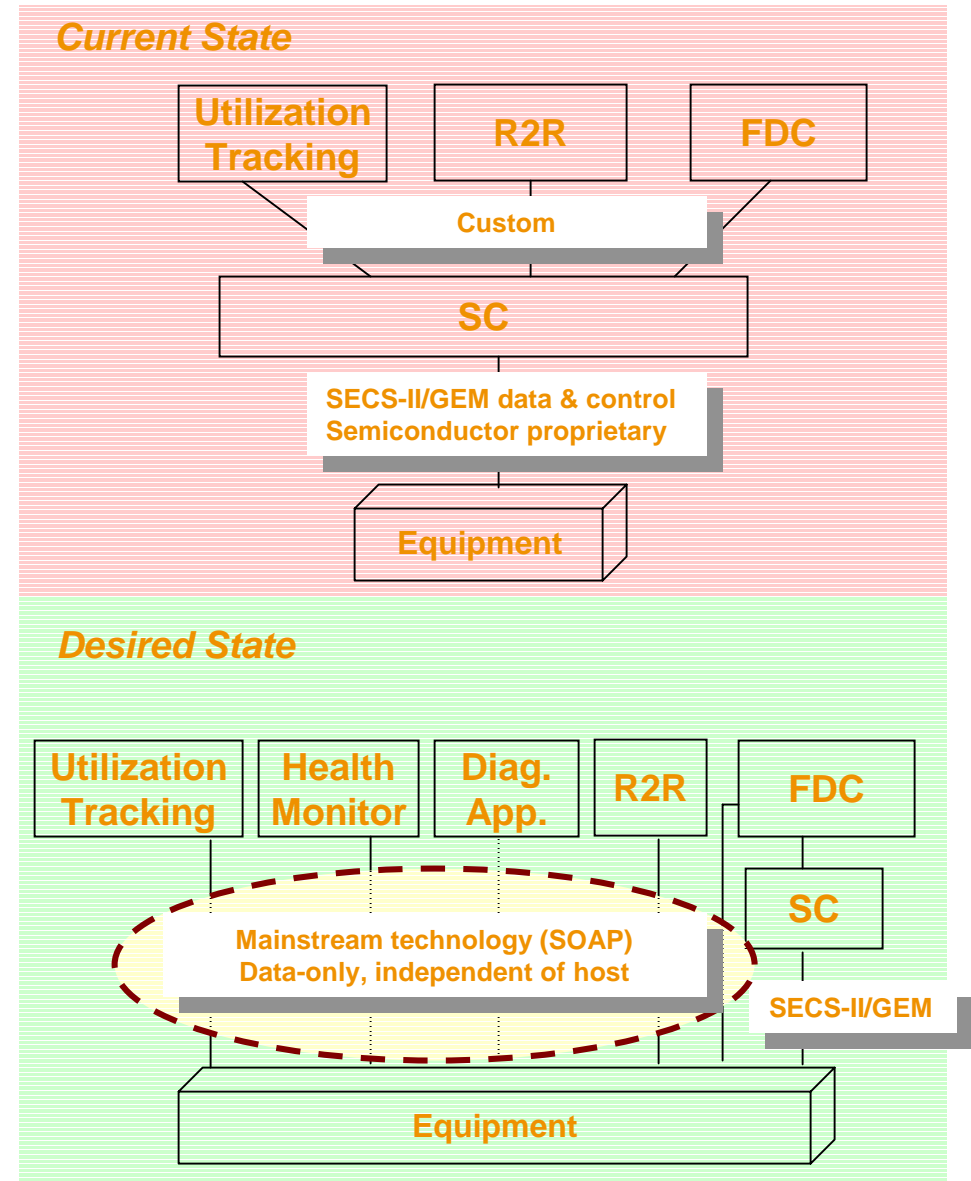
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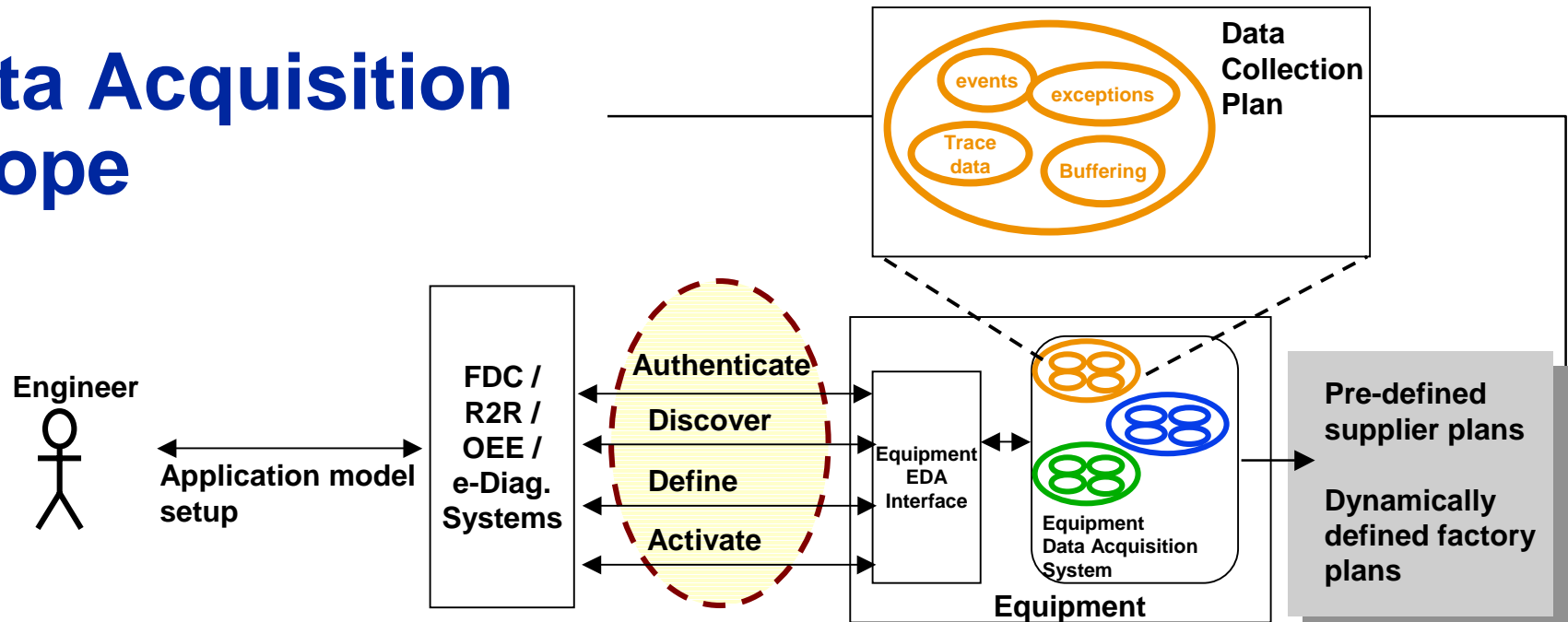
Equipment Data Acquisition Requirements

- **System Requirements:**

- **Host-independent data collection:** clients setup and collect data near-real-time independent of host on/off-line status
- **Security:** only factory-authorized applications permitted to collect data, single point of control is enforced at factory level
- **Self-describing interface:** equipment structure, implemented state models, available data items & types, events, exceptions, and alarms can be learned at runtime from the tool
- **Process control data:** improvements in the ability to collect sampled data for up to 50 parameters per process chamber at a frequency 1% of shortest recipe step (worst case assumption is 1000 scalar parameters at 10Hz)
- **Equipment operational data:** visibility into module- subsystem- and actuator-level activity for facilitating equipment health monitoring, OEE, and diagnostics/troubleshooting



Data Acquisition Scope



SOAP 1.2 / HTTP 1.1 / WSDL 1.2

DDA Scope – long term

- **Typical Use Case:**

- **Authenticate (ballot 3507)**

- App authenticates to equipment

- **Discover (E125 + E120)**

- App queries tool metadata, presents available data to engineer

- **Define (ballot 3509)**

- Engineer establishes data needs according to factory policies or troubleshooting scenario, builds requirements into a DC Plan; app sends plan to tool.

- **Activate (ballot 3509)**

- App activates plan, collects data, performs intended function

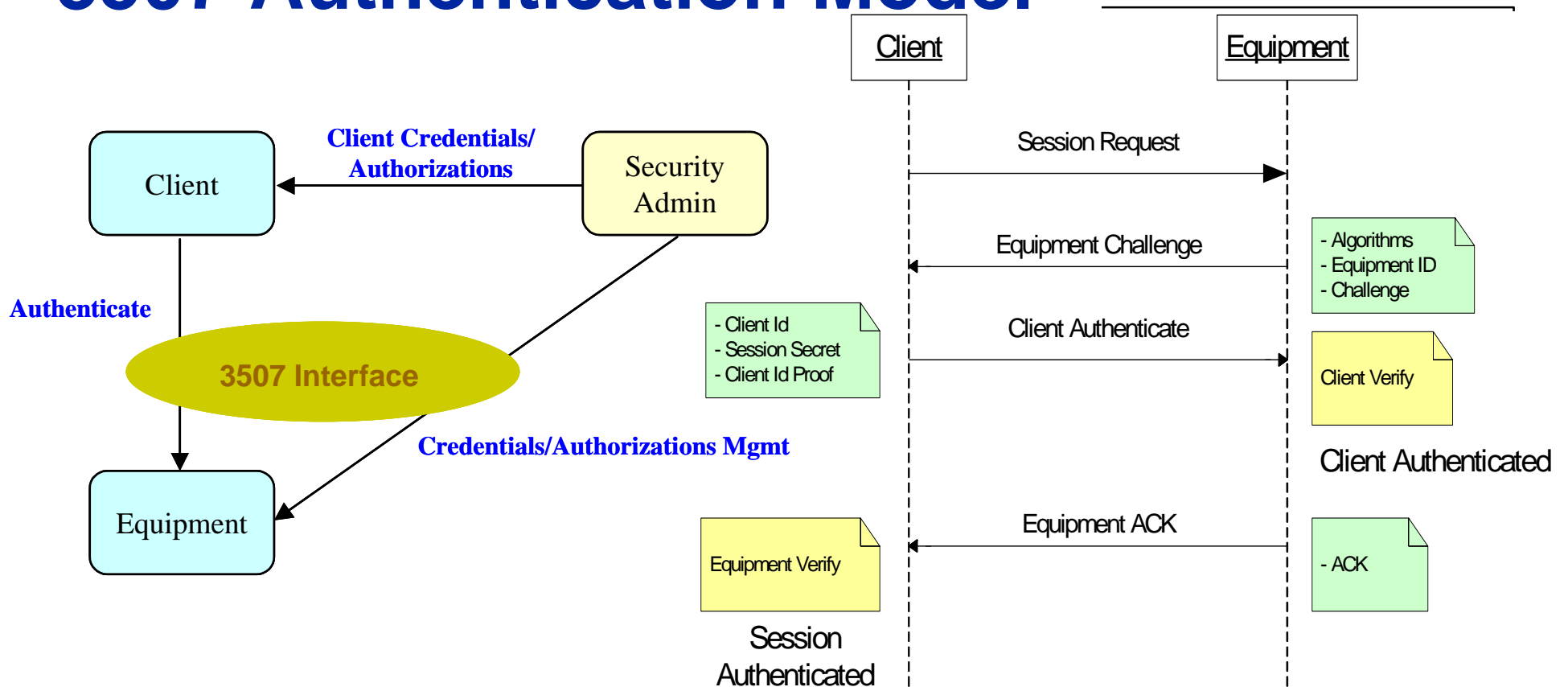


Current DDA-Related Specifications

- E121 – Guide for Style & Usage of XML for Semiconductor Manufacturing Applications (XML TF)
 - Foundational guidelines for XML usage within SEMI
- 3507 – Equipment Client Authentication and Authorization (DDA TF)
 - Abstract model of authenticated communication and ACL (Access Control List) management
- E120 – Common Equipment Model (OBEM TF)
 - Abstract model of equipment physical equipment structure
- E125 – Equipment Self Description (DDA TF)
 - Abstract model of equipment metadata describing units, types, equipment structure, state models and events, alarms/exceptions, etc.
- 3509 – Data Collection Management (DDA TF)
 - Abstract model of Data Collection Plans, DCP management interface and state models, and DCP reporting formats
- PR8 – Proposed Standard for Equipment Data Acquisition (DDA TF)
 - Concrete specification of SOAP 1.1 reduced-scope interface for data collection

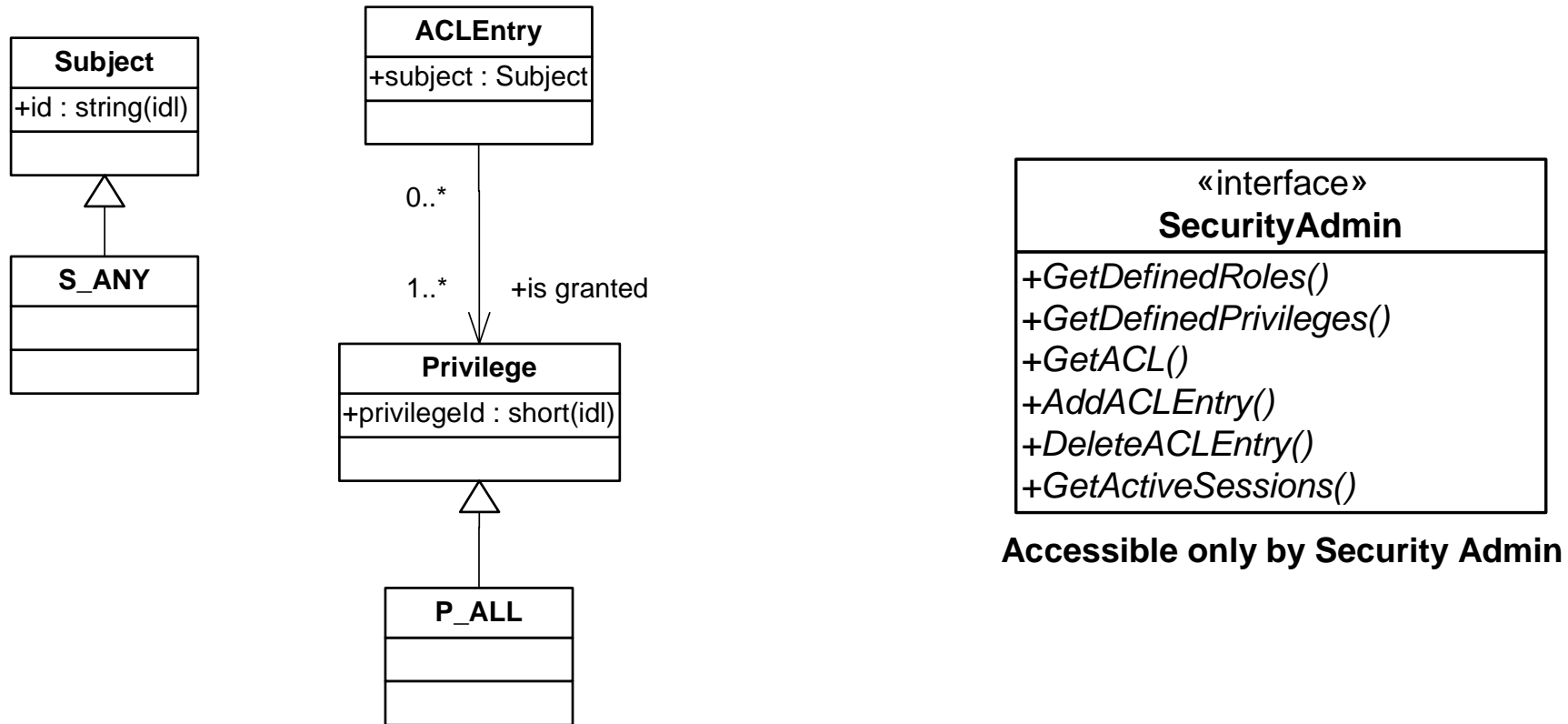


3507 Authentication Model



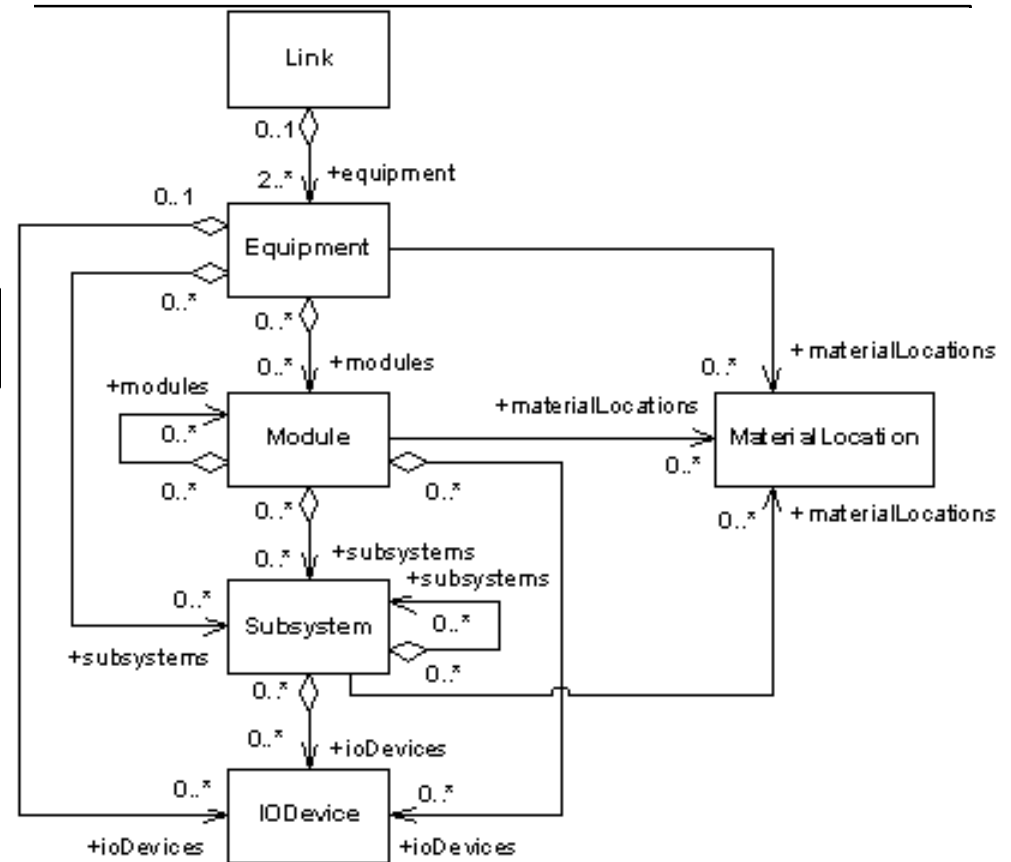
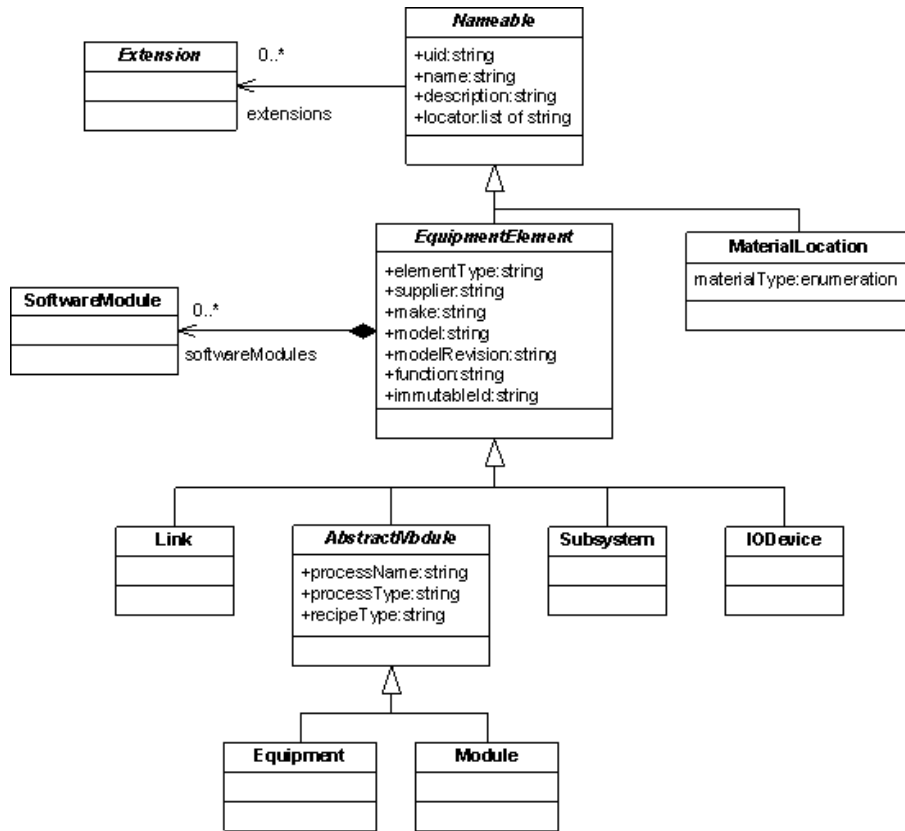
- **Central SecurityAdmin**
 - Implemented by factory, assigns credentials to applications
- **Equipment client**
 - Establishes session with equipment, provides credentials
- **Equipment**
 - Challenges client for credentials, denies session if not accepted

3507 Authorization Model



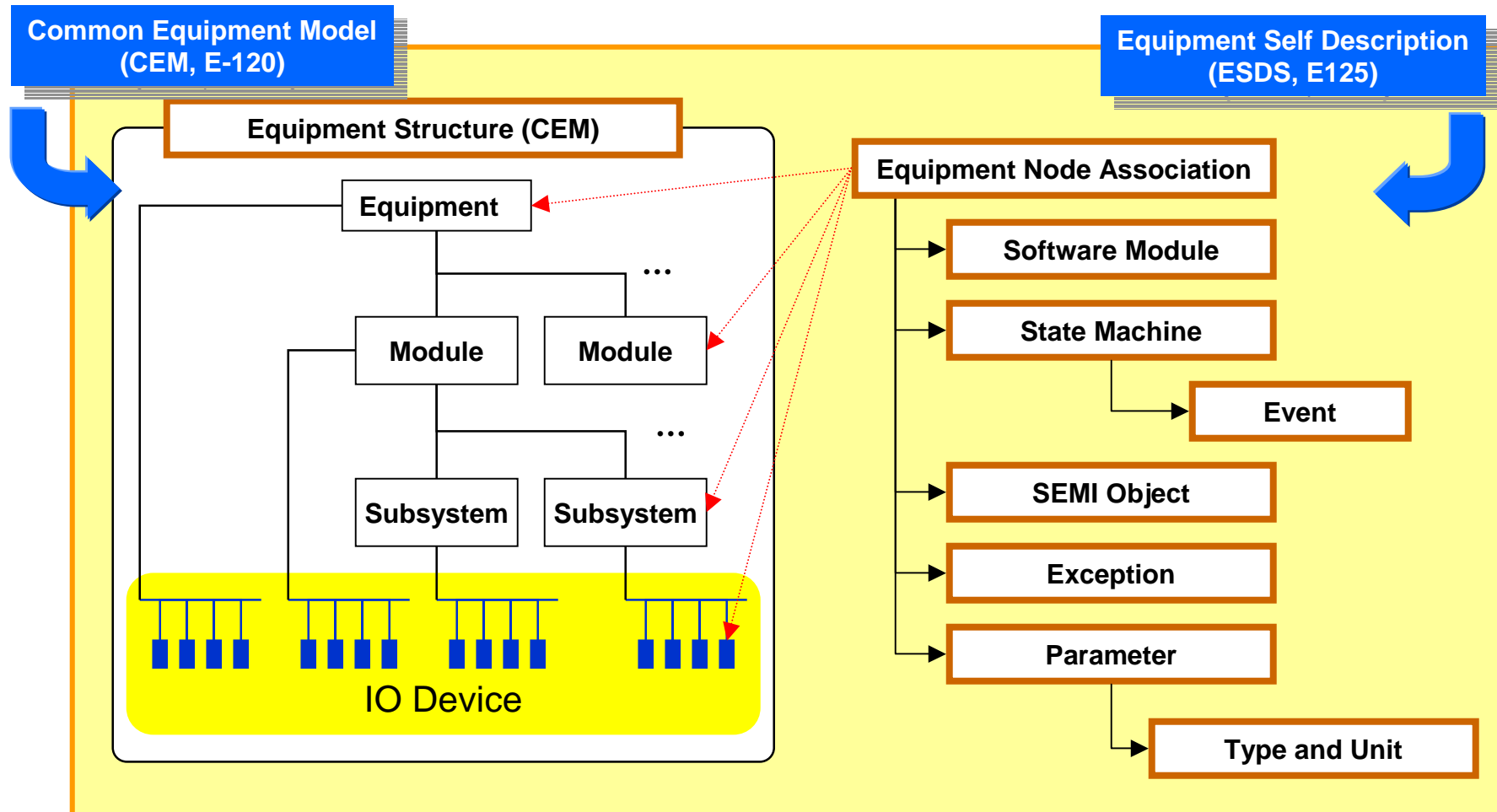
- **Security principals are represented as “Subjects”**
 - Can be an application id or a role
- **Privileges are assigned to subjects to create an ACL entry**
 - All service requests originating from a principal are checked against these entries before the request can proceed

E120 CEM



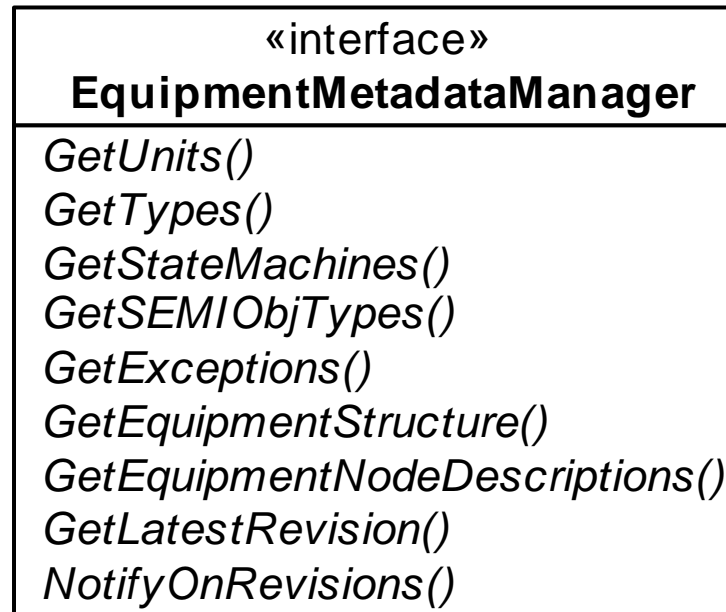
- Hierarchical model
- Supports description of low-level sensors, higher-level processing modules, and the overall equipment
- Allows 'nesting' (e.g., modules within modules)

E125 Equipment Metadata



- **Metadata is modularized**
 - Units, types, equipment structure, exceptions, etc. are defined independently of one another
- **Associations with equipment structure are centralized**
 - Each equipment node that can produce data is referenced by name (CEM locator)
 - The data types, events, exceptions, etc. that an equipment node can produce are associated with that node by reference to a unique id

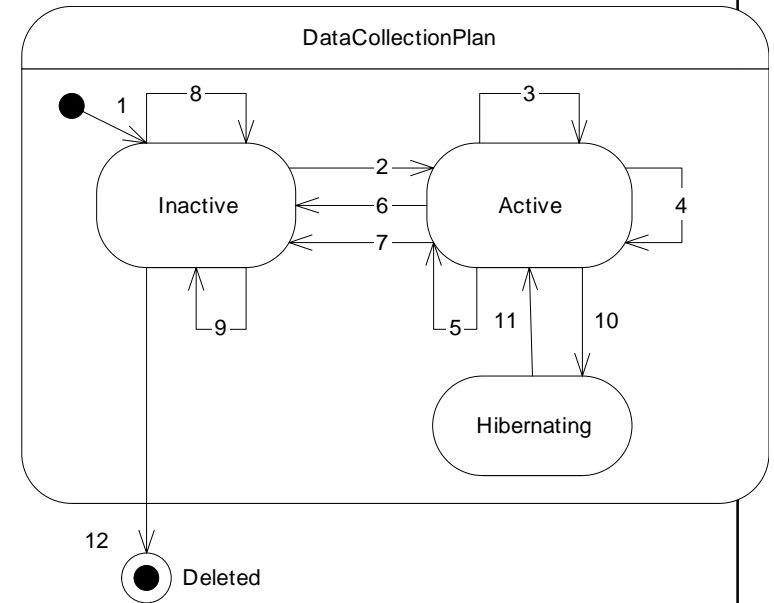
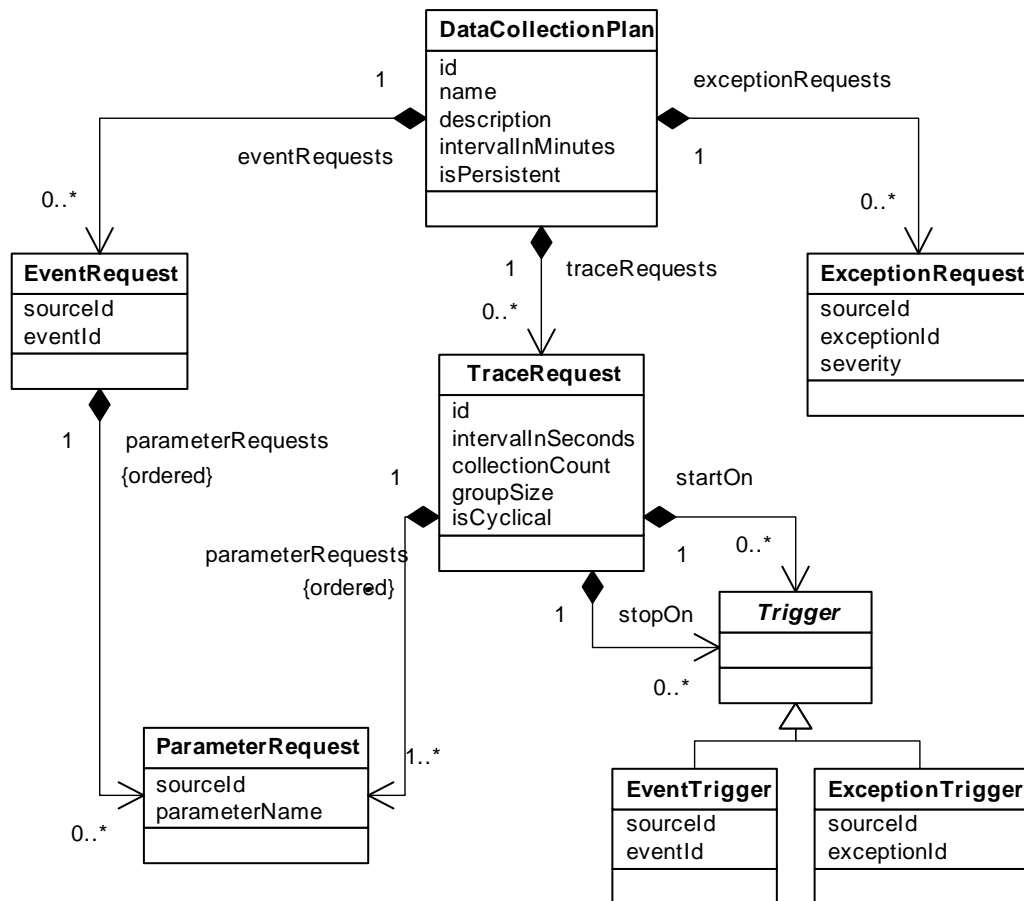
E125 Metadata Access



- **Equipment metadata is supplier-sensitive information**
 - **Access to it is via an authenticated session with the equipment**
- **Metadata interface is modular**
 - **Follows the modularity of each type of metadata**
- **Provides revision tracking/notification by date (proposed)**

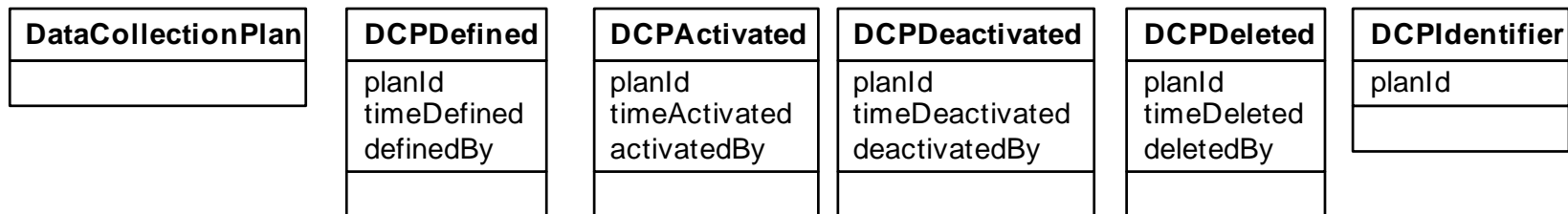
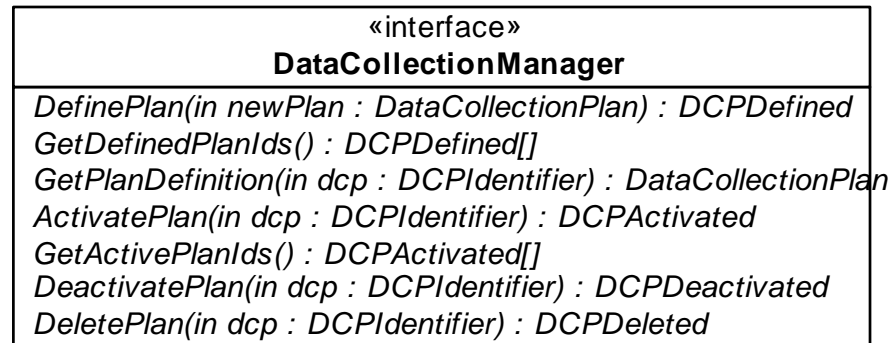


3509 Data Collection Plans



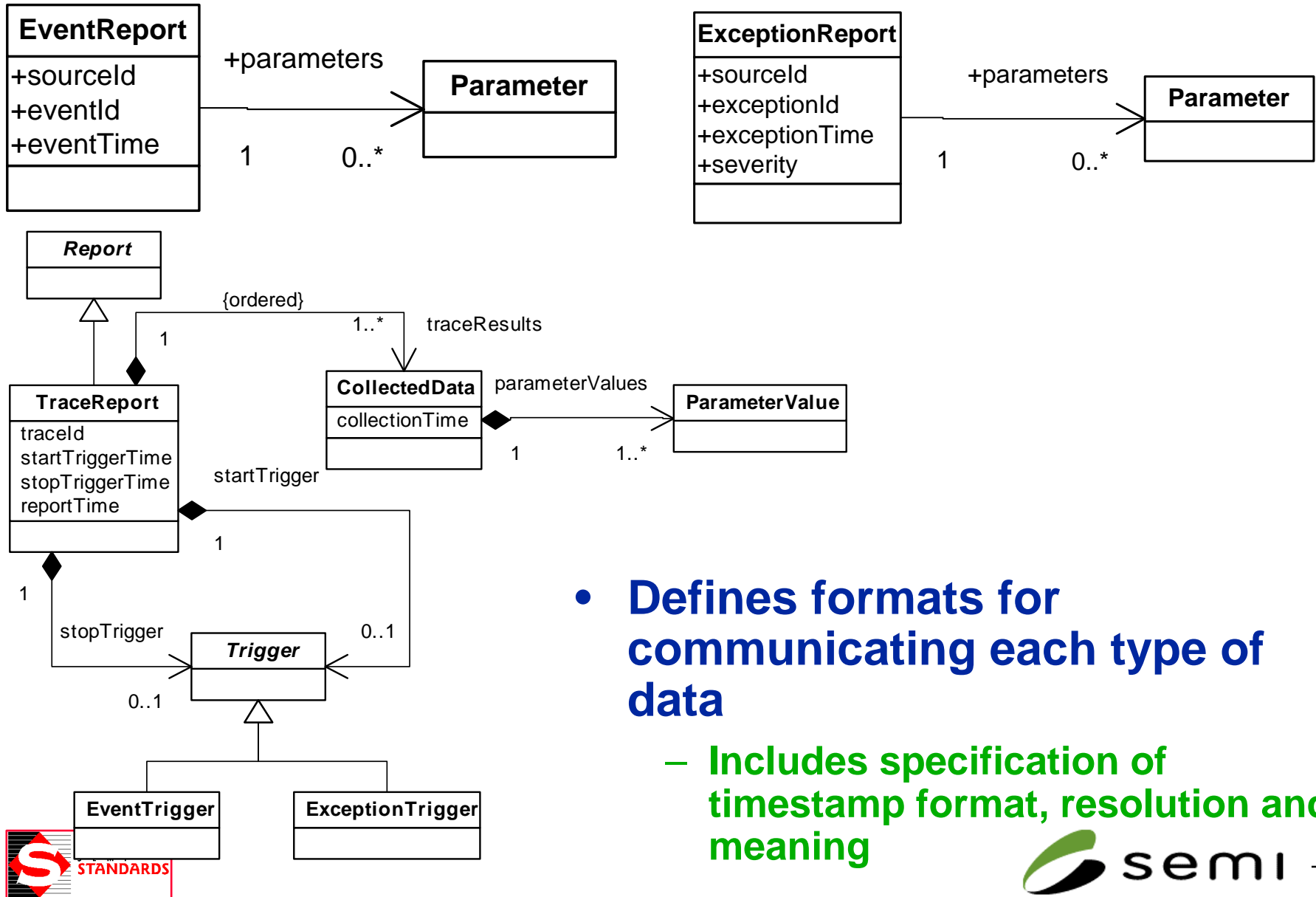
- Data items are identified by two fields
 - Source and identifier
- Each plan can include all data needed for a specific purpose
 - Events, exceptions, and trace data
- DCP's can specify on-tool buffering policy for all data
- DCP's can be 'active' across equipment shutdowns
 - Permits collection of data during power up
- Acquisition follows 'push' model

3509 DCP Management



- **Equipment supports DCP management interface**
 - **Definition, lookup, activation, de-activation, deletion, etc.**
- **Key operations have associated privileges**
 - **Helps support factory single point of control policies**
- **No a-priori limitations**
 - **No pre-specified limit to number of plans that can be defined or concurrently activated**

3509 Data Collection Reports



- **Defines formats for communicating each type of data**

- **Includes specification of timestamp format, resolution and meaning**

Short-term (PR8) vs. Long-term Scope

- Metadata concepts and formats not specified for short-term
 - Long-term spec is E125 (aka 3510)
- Data collection plan formats and definition interface not specified for short-term
 - Long-term spec is 3509
- Authentication and authorization not specified or required for short-term
 - Long-term spec is 3507
- Multi-client not required
 - All long-term specs support multi-client
- Data management messages (only) can be sent via SECS-II in the short term



Summary

- **DDA Long-Term Specifications**
 - Secure, flexible, self-describing data collection
 - Need ongoing input from supplier and ICM communities on applicability and functionality through active participation in TF activities and reviews PRIOR to voting cycles
 - Conceptual models nearing an acceptable level of completeness
- **DDA Interim Specification**
 - Scaled-down self-describing data collection
 - Need engagement in ISMT prototyping and pilot activities to enable early implementations based on the long-term concepts and technologies



The TrackSys Tool

A Simple Case Study

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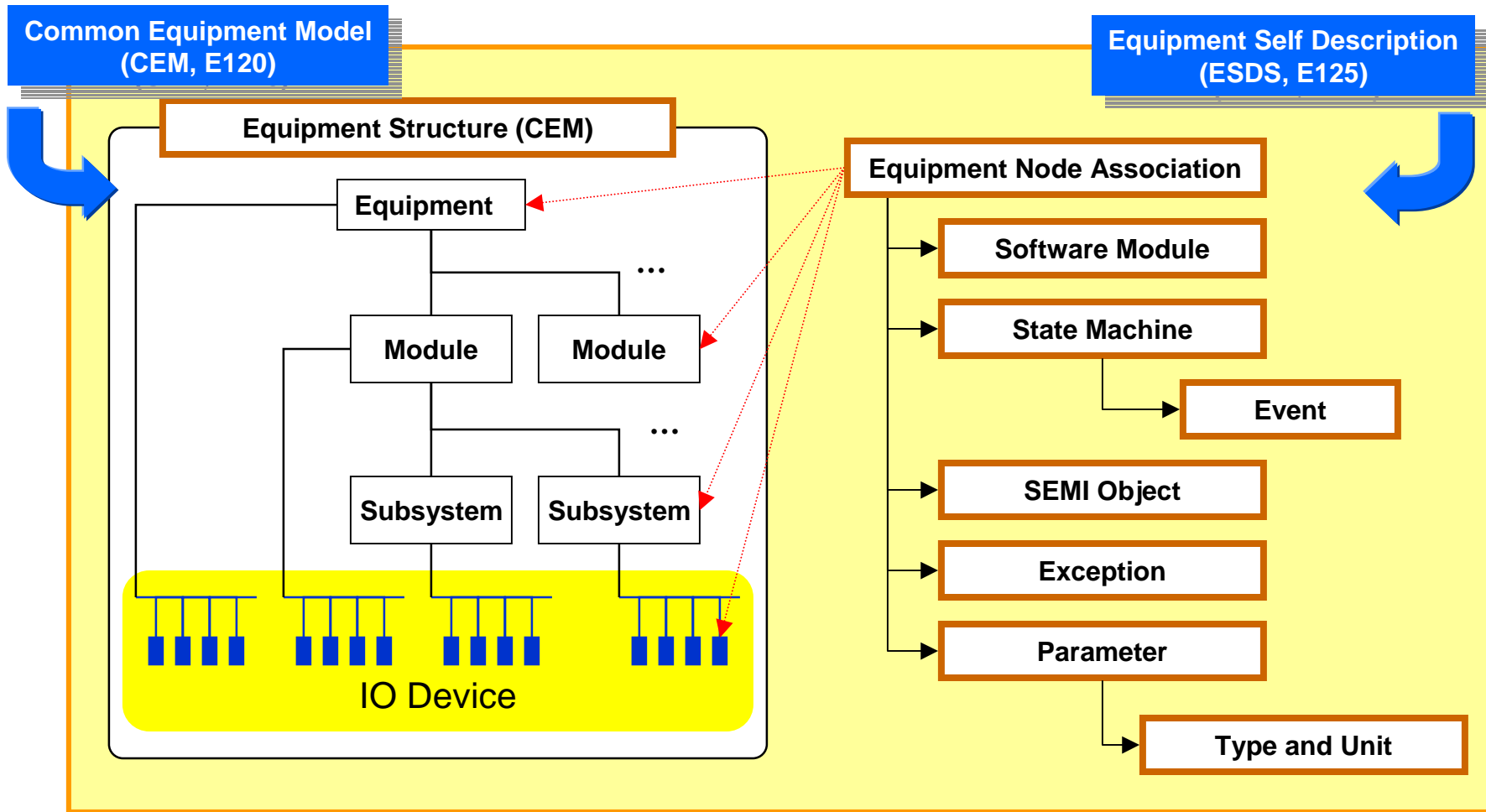
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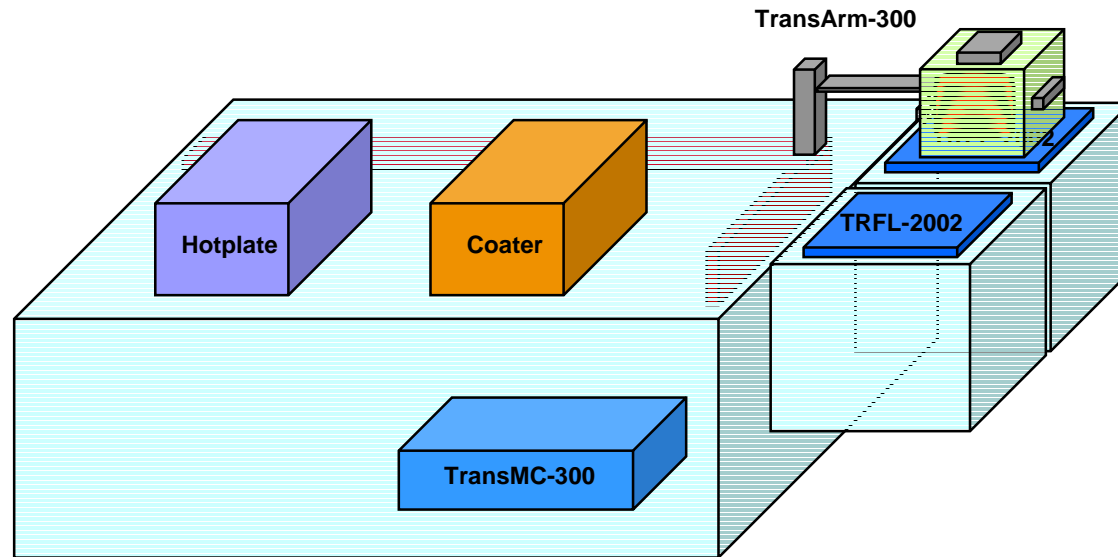
Objectives

- Use a fictional tool as an example to...
- Illustrate how to model the equipment using E120 (Common Equipment Model)
- Illustrate how to model key equipment metadata using E125 (Equipment Self Description)
- Illustrate how to use equipment metadata to create data collection plans using 3509 (Data Collection Management)

CEM/Self-Description Refresher

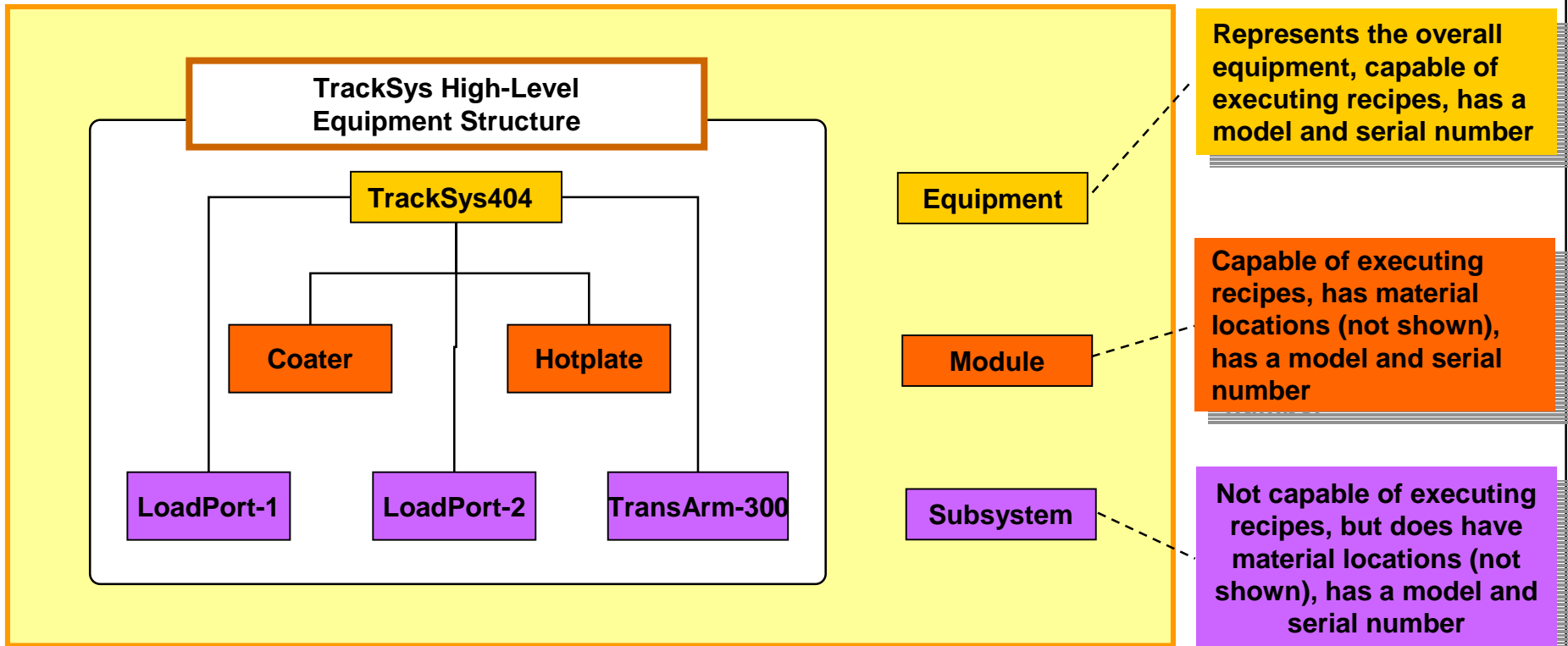


“Simple” Tool



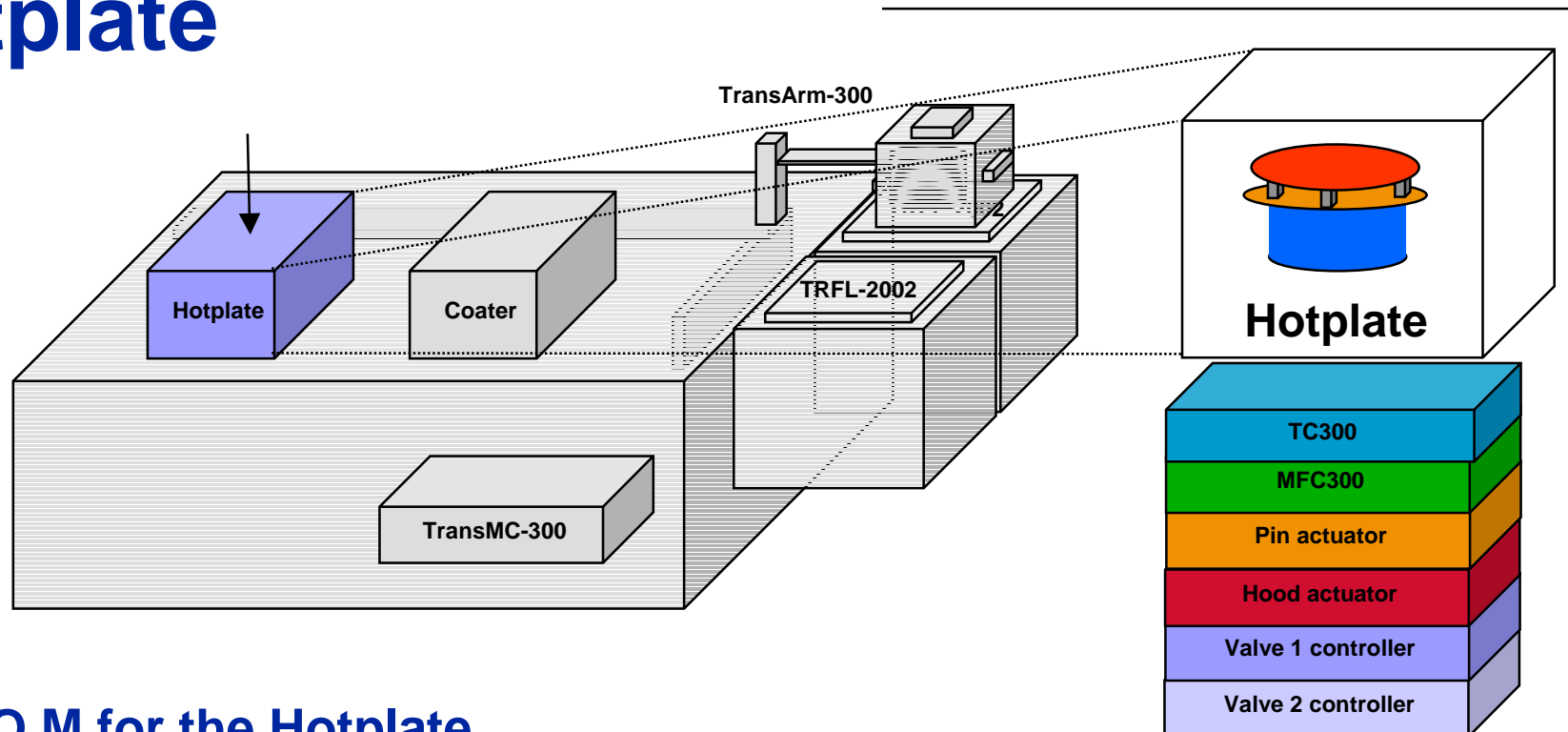
- **Imaginary, simplified, and completely useless for real manufacturing but nevertheless illustrative Exhaustless Spin Coat and Bake tool from TrackSys, Inc.**
 - 2 Load Ports
 - 1 Wafer transfer robot
 - 1 Spin coater
 - 1 Hotplate

CEM Representation



- Major modules are the hotplate and coater
- Major subsystems are the load ports and transfer arm

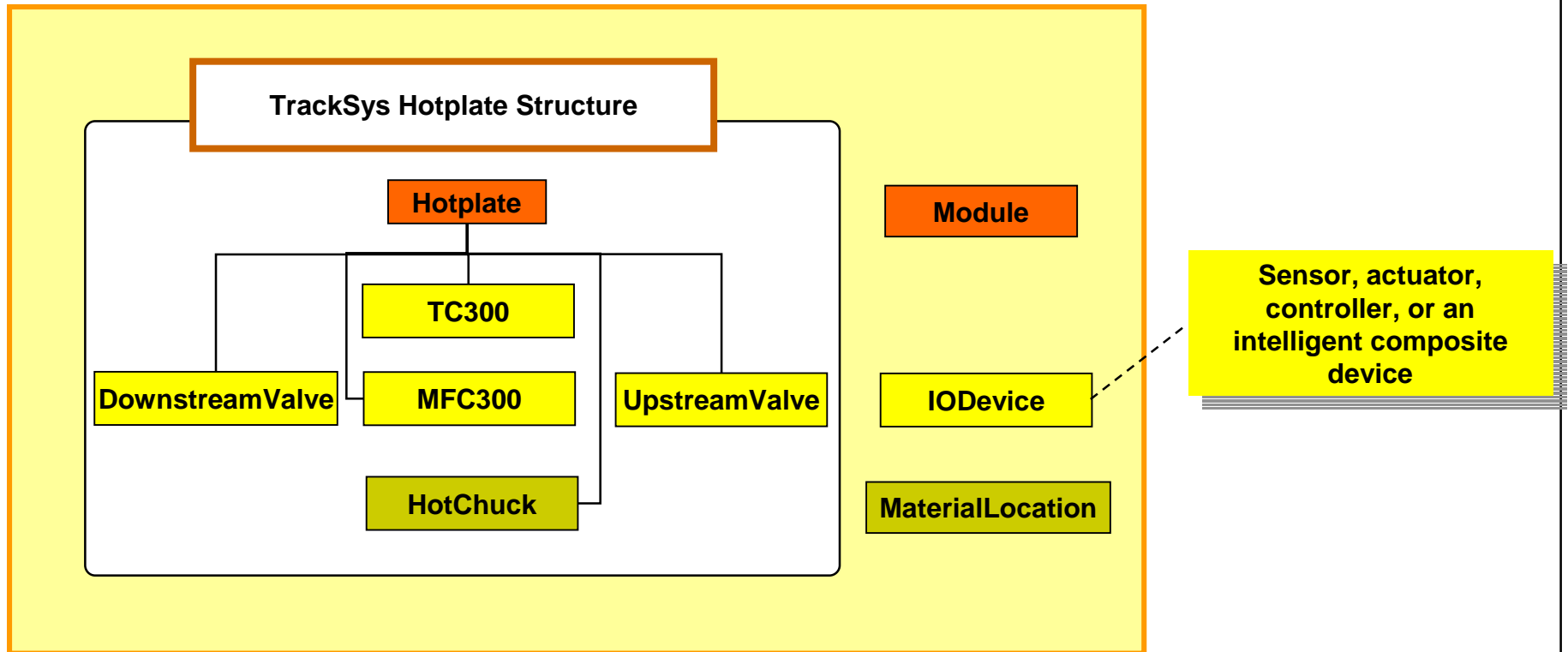
Hotplate



- **B.O.M for the Hotplate**

- Hot chuck, chamber hood, pins, and all associated actuators developed by TrackSys
- Temperature controller (model TC300) and sensor (platinum RTD) purchased from TCSysystems, Inc,
 - RS-232 interface
- MFC (model MFC300), 2 valves (model DMV3630), and 2 valve controllers (model DMVC300) purchased from DigiMass
 - RS-232 interface for MFC, analog for valve controllers

CEM Representation



- Chamber hood, pins and associated actuators all modeled together as a **Module**
- Temperature controller and sensor modeled as a single **IODevice**
- Each valve and its controller modeled together as a single **IODevice**
- Hot chuck modeled as a **MaterialLocation** belonging to the hotplate **Module**

Basic operation

States

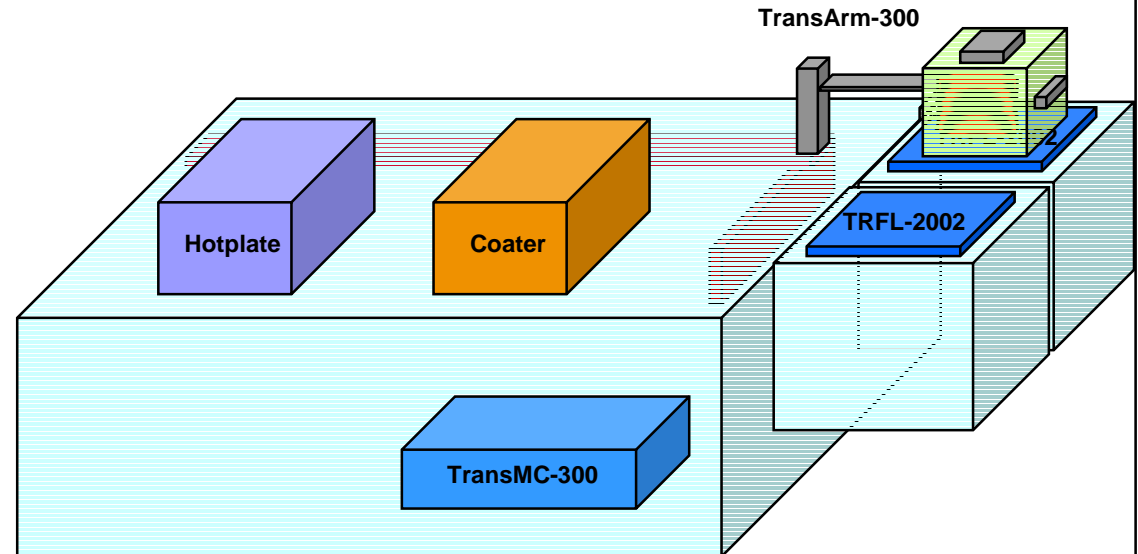
Port occupied
Port unoccupied
Carrier docked
Carrier undocked
Carrier clamped
Carrier unclamped
Carrier door open
Carrier door closed
Carrier id read
Carrier id not read
Slot map read
Slot map not read
Transfer robot in transit
Transfer robot at rest
Transfer arm in transit
Transfer arm at rest
Transfer arm occupied
Transfer arm unoccupied

Data

Port id
Carrier id
Slot map
Transfer robot coordinates
Transfer arm coordinates

Programmable Parameters

Robot position



• Wafer retrieval from carrier

- Carrier is placed, docked, opened
- Slot map is read
- Transfer arm lowers to wafer position, extends into carrier door, lifts, detects presence of wafer on arm, and retracts out of the carrier

Basic operation (cont.)

States

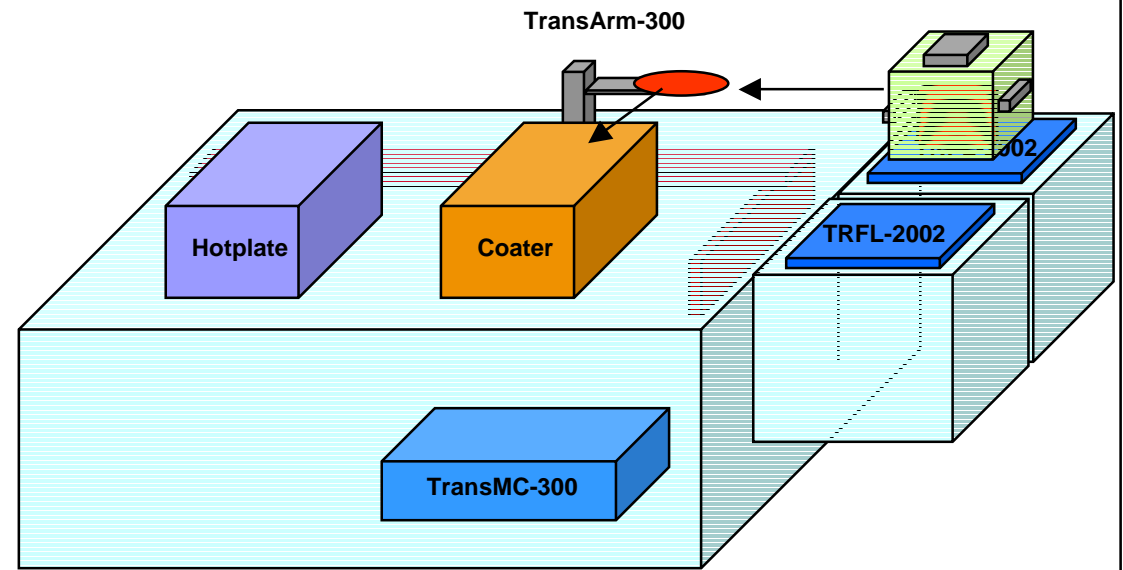
Transfer robot in transit
Transfer robot at rest
Transfer arm in transit
Transfer arm at rest
Transfer arm occupied
Transfer arm unoccupied

Data

Transfer robot coordinates
Transfer arm coordinates

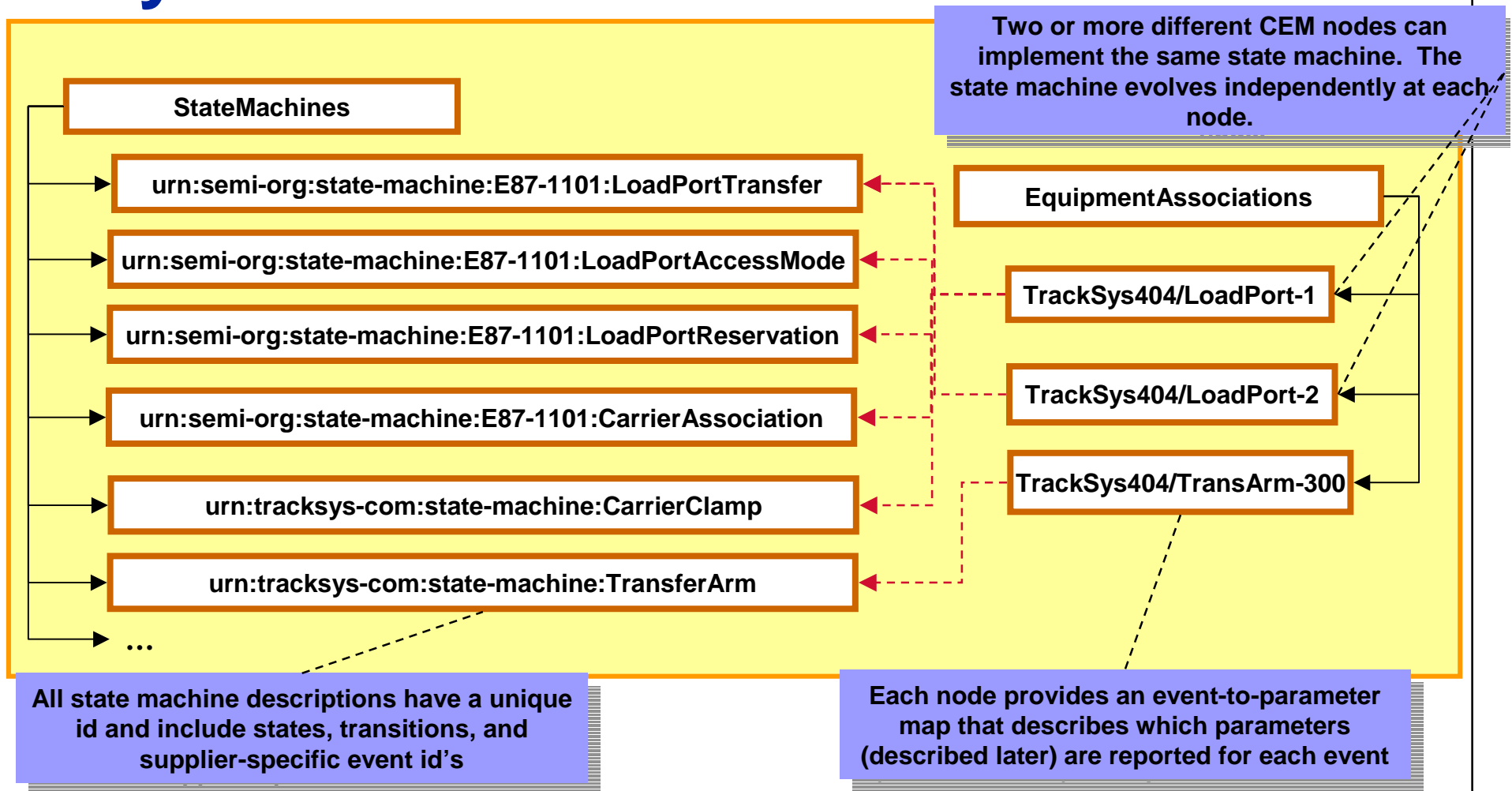
Programmable Parameters

Robot position



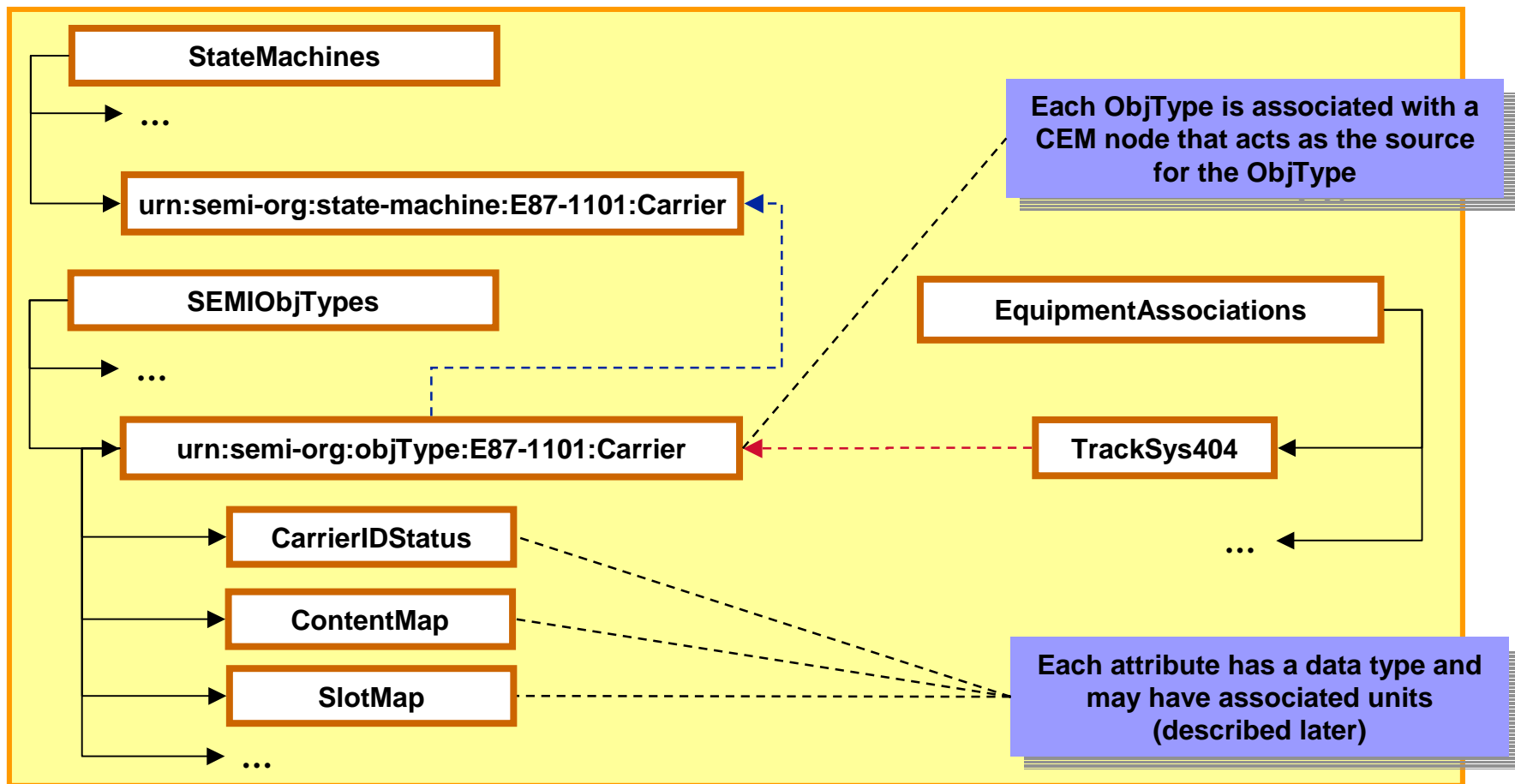
- **Wafer transfer to coater**
 - Transfer robot moves to coater position
 - Raises/lowers arm to load height for the coater
 - Extends into coater
 - Places wafer on spin chuck
 - Transfer arm retracts from coater, remaining at the coater position

Key E125 Metadata – State Machines



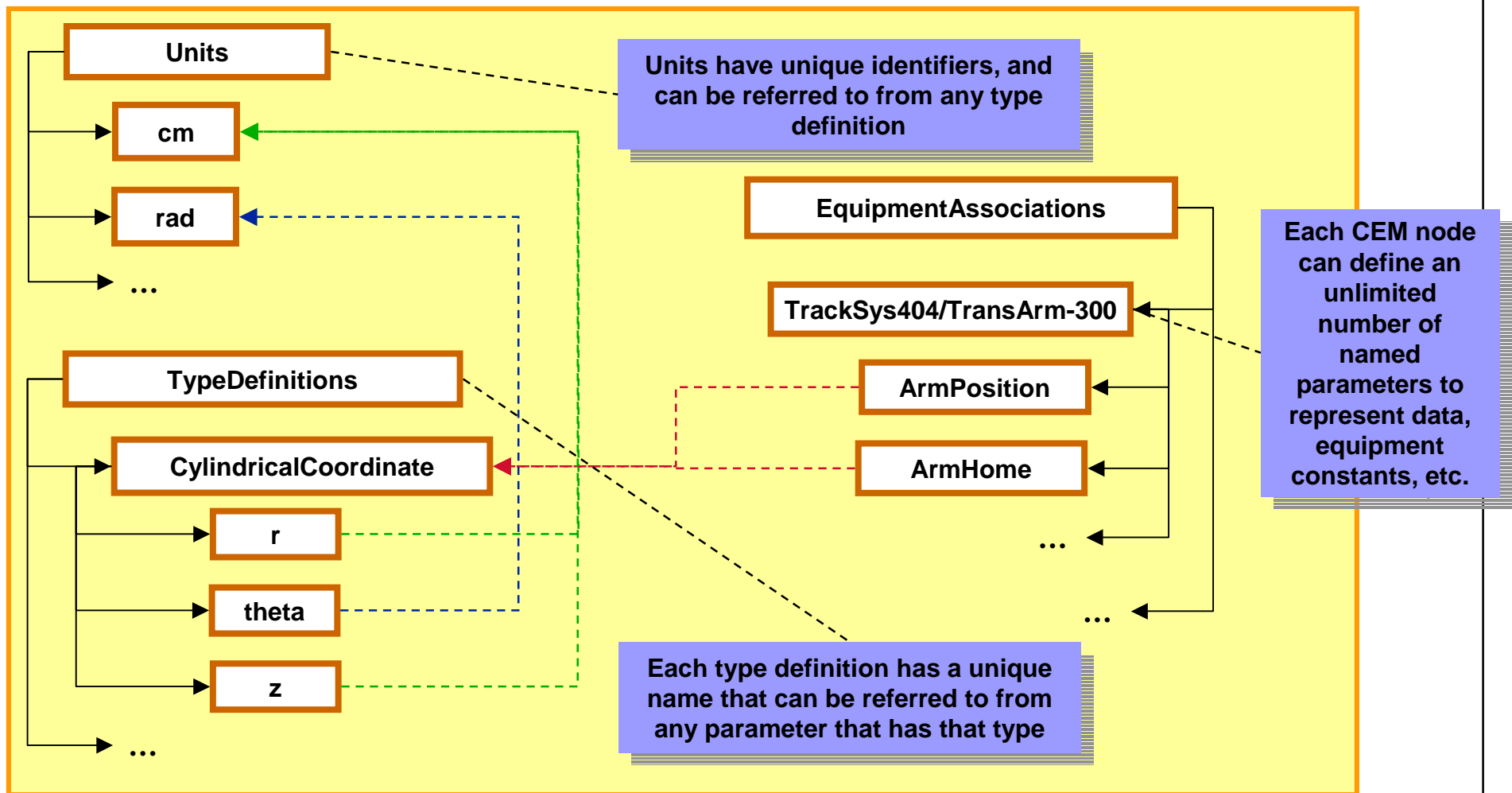
- All SEMI and non-SEMI state machines are described once
- Associations are created between these state machines and all CEM nodes that implement them
- All state machine descriptions can be queried using the “GetStateMachines” operation. Nodes that implement the state machines can be queried using “GetEquipmentAssociations”

Key Metadata – SEMI ObjTypes



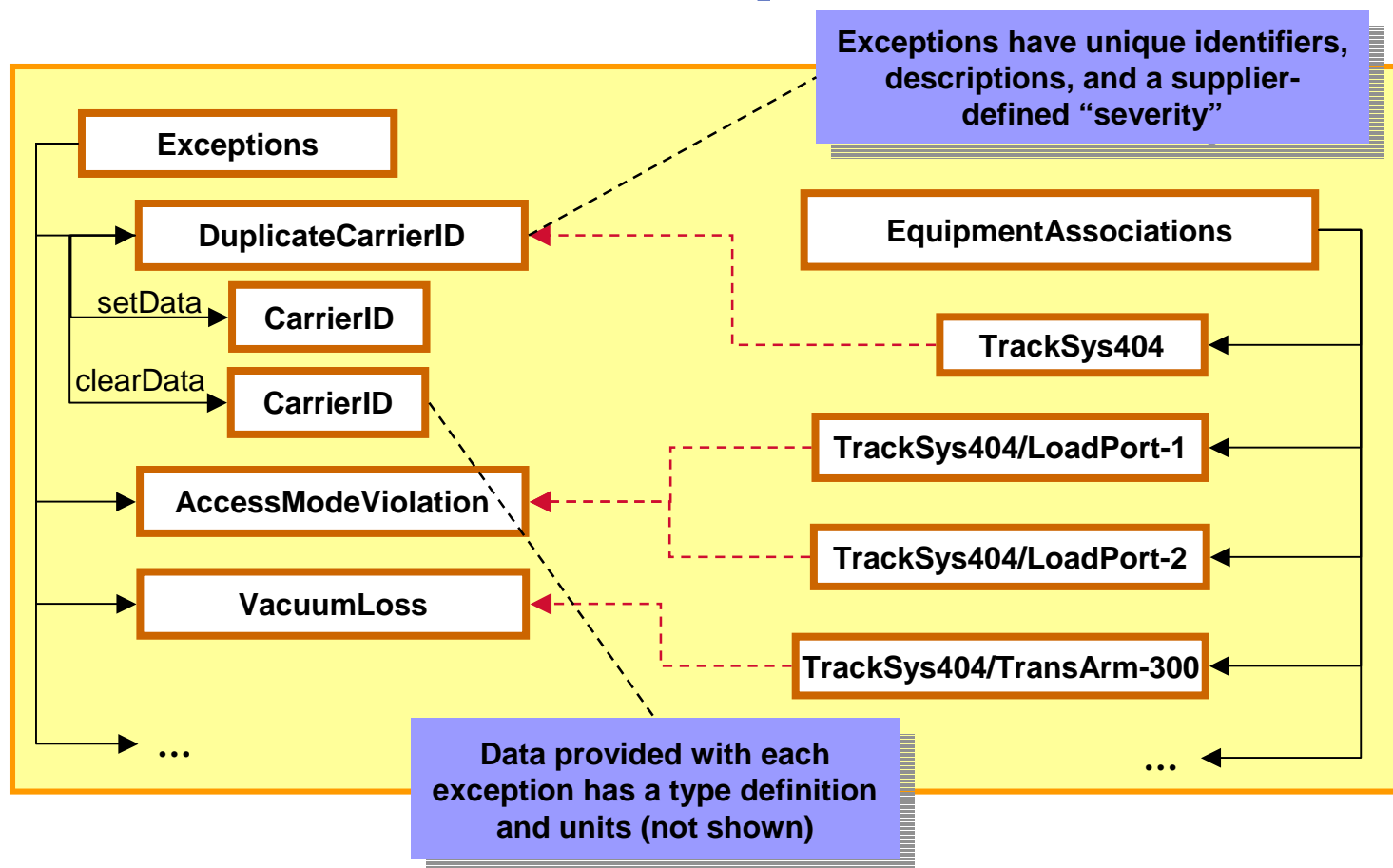
- Any state machines for the ObjType are described once, as is the ObjType itself
- The ObjType description refers to the state machine, and adds descriptions of its attributes
- The ObjType can then be associated with one or more CEM nodes
- All ObjTypes can be accessed using the “GetSEMIObjTypes” operation

Key Metadata – Parameters



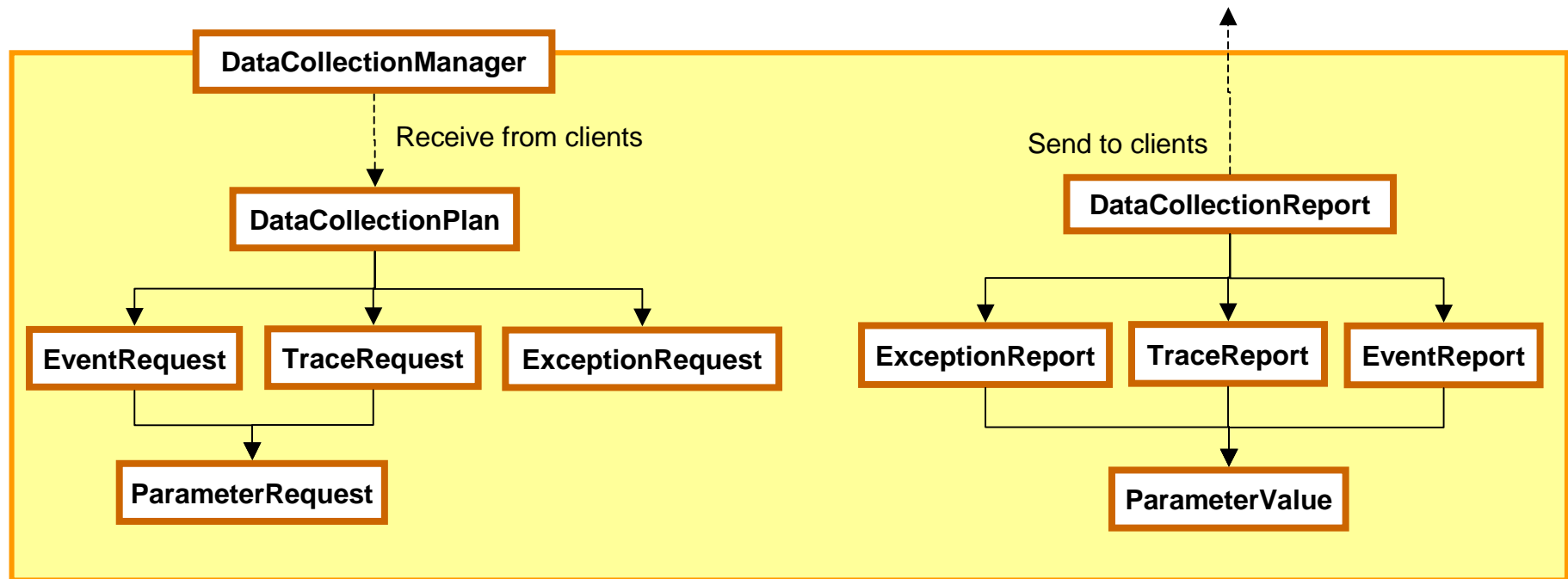
- Any units used by the equipment are described once, as are any data types (strings, arrays, structures, etc.).
- The units and types can then be used by parameters, which are defined for each CEM node
- All units can be queried through “GetUnits”, type definitions through “GetTypes”, and parameters for each CEM node through “GetEquipmentAssociations”

Key Metadata – Exceptions



- Each unique exception is described once, including the set/clear data that is provided (for alarms). Alarms and supplier-defined runtime errors can be described
- Each exception can then be associated with one or more CEM nodes
- All exceptions can be queried through “GetExceptions”. The nodes that report exceptions can be queried through “GetEquipmentAssociations”

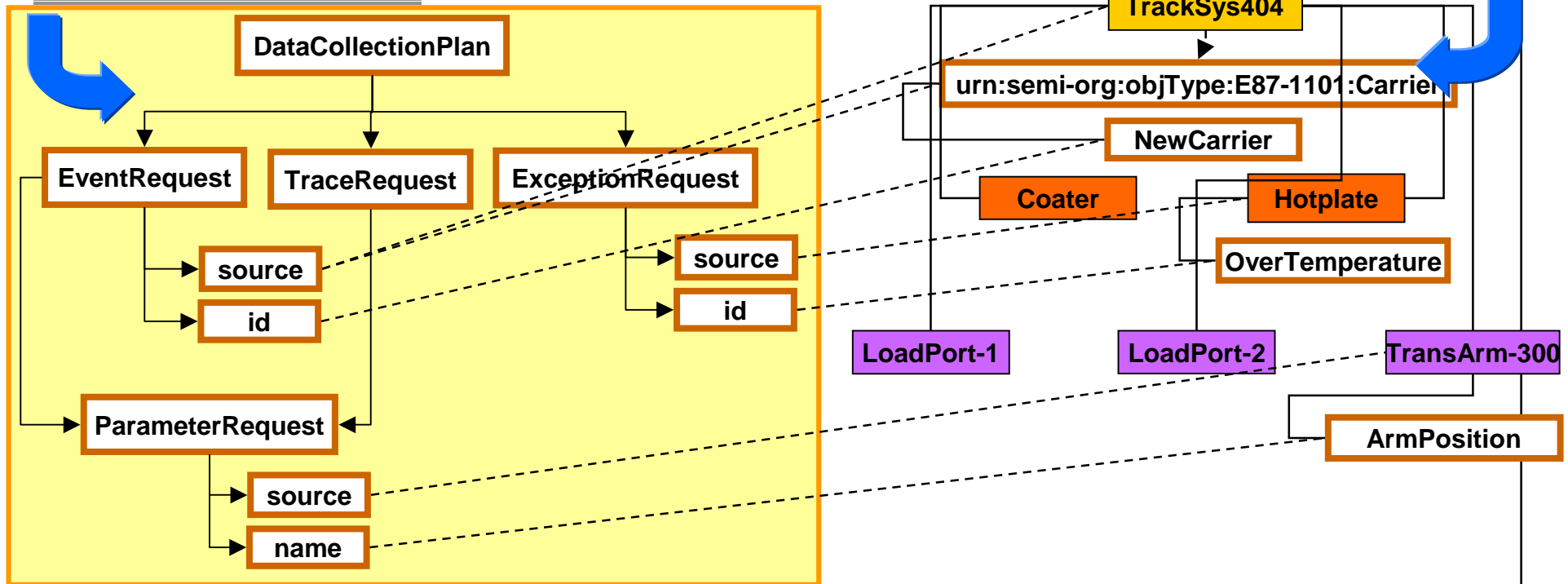
Data Collection Mgmt (3509) Refresher



- Clients submit Data Collection Plans (DCP's) to the equipment using the DataCollectionManager interface
- Each DCP describes the events, trace data, and exceptions of interest to the client
- DCP data is sent to clients via a data collection report message

Data Sources and Items

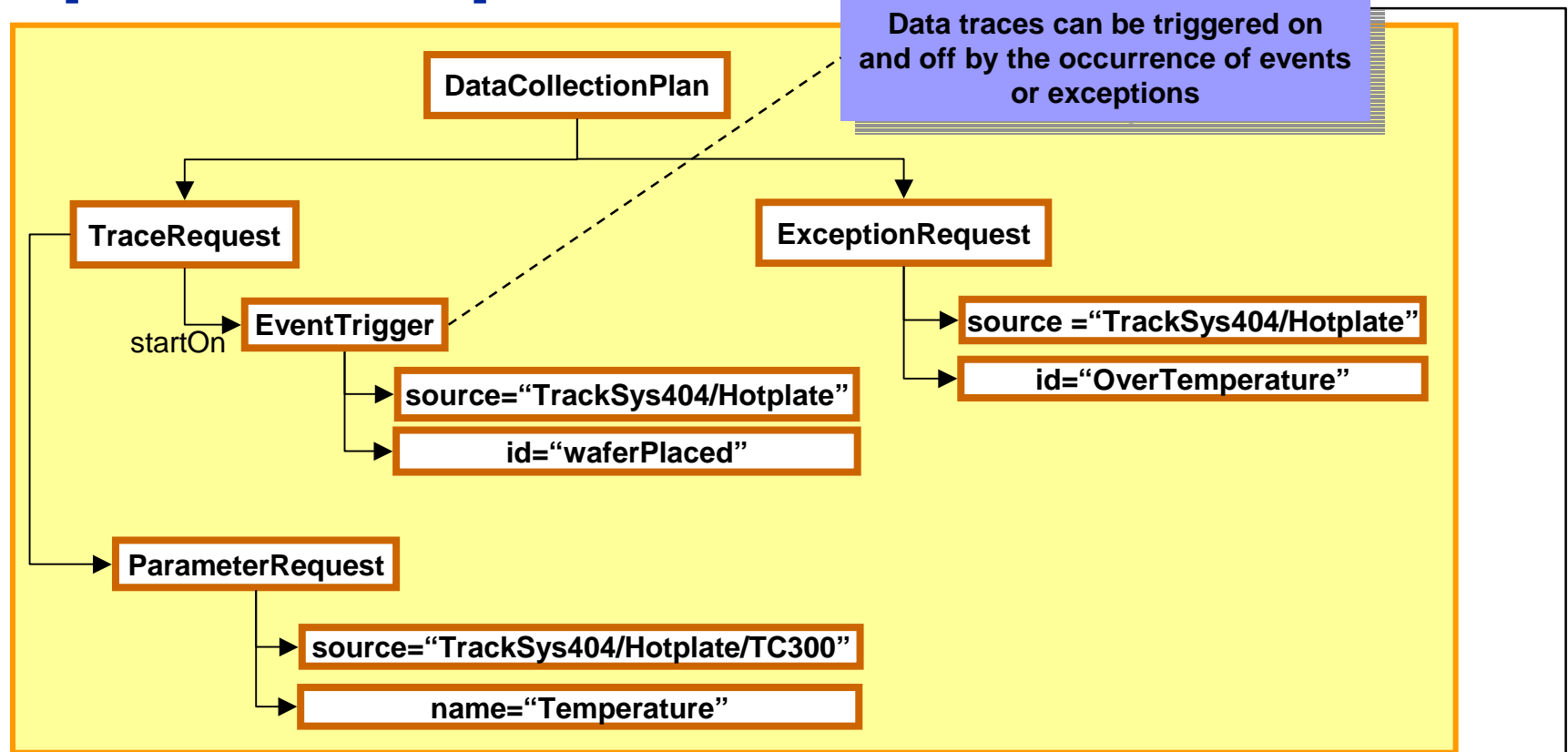
Data Collection Management
(DCM, 3509)



- Exceptions, events, and parameters are identified by two fields: a source and a name or id
- Exceptions, events, and parameters that belong to a CEM node have the CEM node as the source
- Events and attributes of an ObjType have the CEM node AND the ObjType name as the source

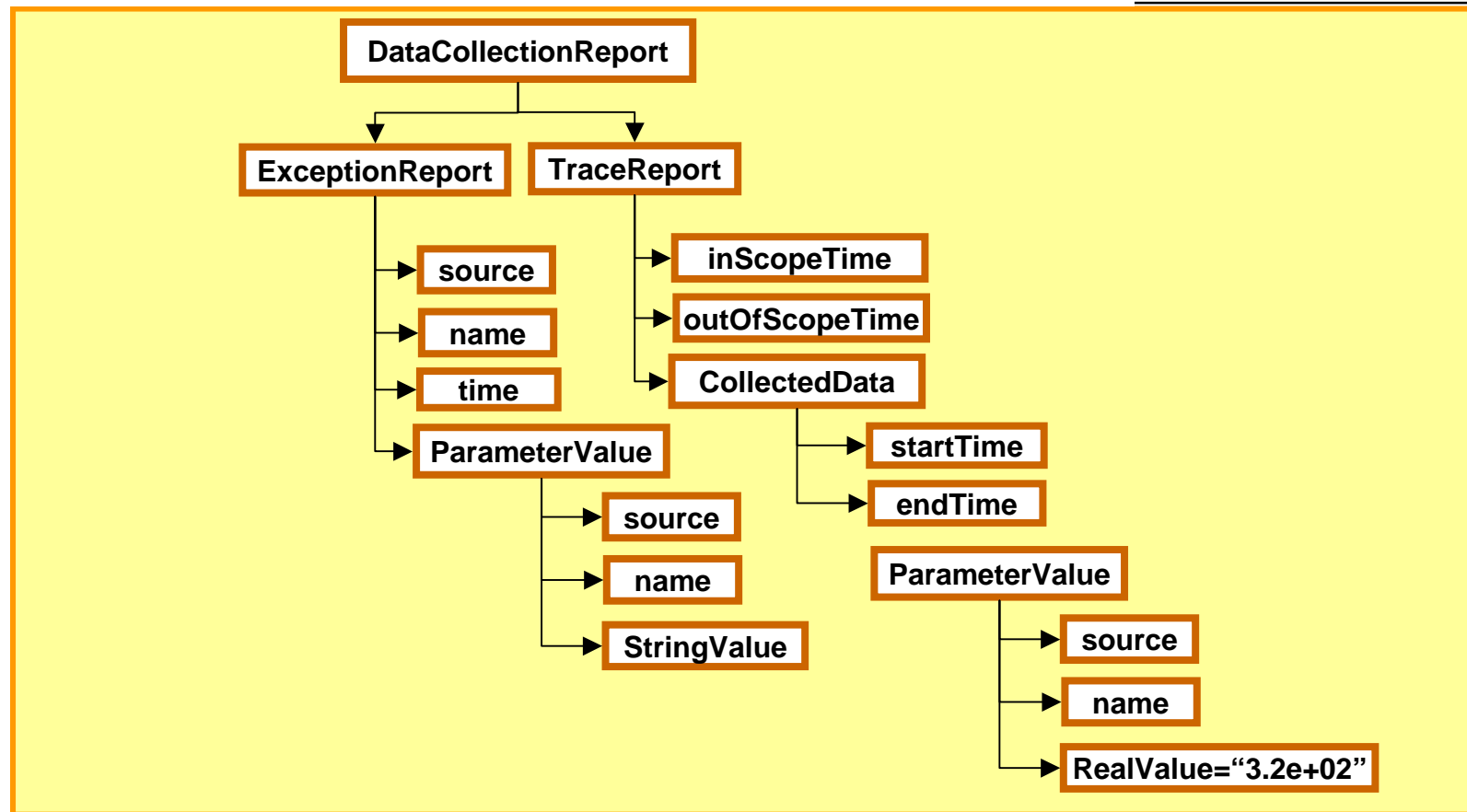


Hotplate Temperature Trace



- DCP's can be as specific or as all-inclusive as needed, according to the intended use
- A very simple DCP for the hotplate that traces the temperature profile can be created and provided by TrackSys when the tool is delivered

Hotplate Temperature DCR



- DCP output can be buffered in integral minutes; all events, exceptions, or trace results produced in that interval are packaged together
- DCP output can be unbuffered – events, exceptions, and trace results are sent as they are produced

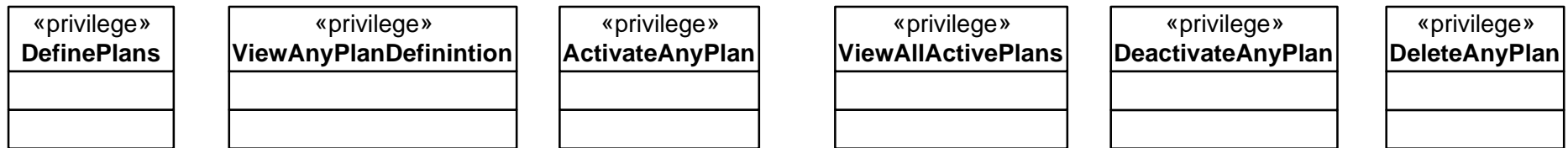
Summary

- **E120 provides a consistent vocabulary for describing equipment structure**
- **E125 provides a comprehensive set of data structures to describe information available from the equipment**
- **E125 and E120 together simplify the naming and identification of equipment data items**
- **E125 and 3509 together create a more manageable and flexible data collection environment**



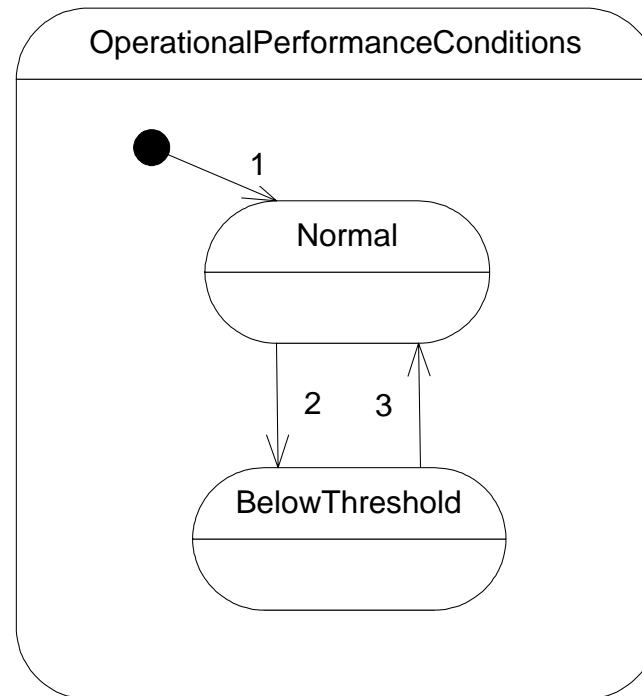
Backup

3509 DCP Management Privilege Model



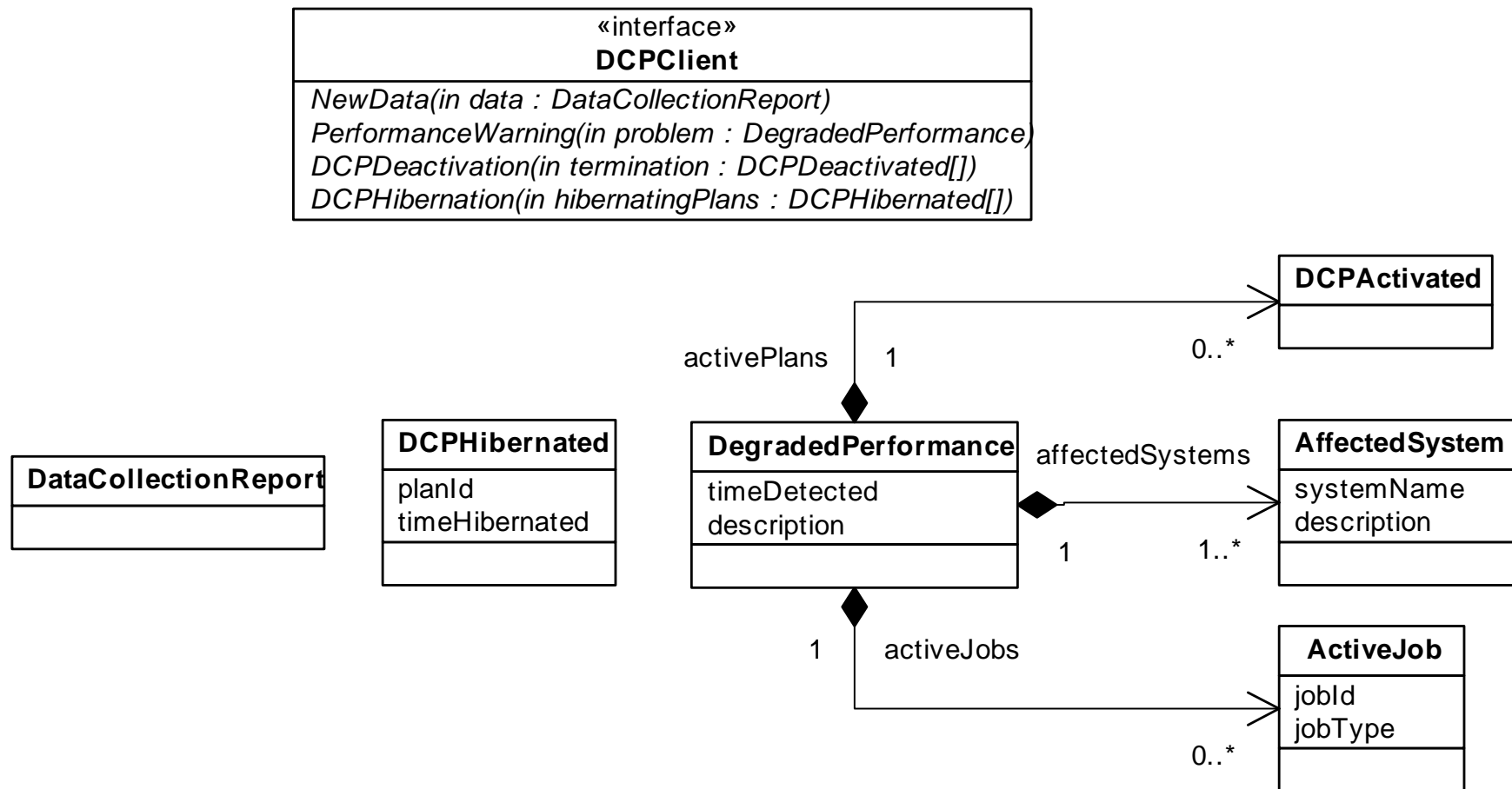
- **Definition, viewing, activation, and deletion all have associated privilege**
 - **Allows factory to enforce policy of choice**
 - If a client has none of these privileges, it is not possible to do anything related to data collection
 - Can restrict a client to its own sandbox, unable to view, activate, or delete any DCP's other than those it defines
 - Can assign a client 'administrative' privilege to activate/de-activate view and delete any DCP at any time

3509 Equipment Performance Self-Monitoring



- **Allows equipment to warn clients of performance problems**
 - **Notifies clients periodically while performance remains below threshold**
- **Suppliers define performance thresholds**
 - **Supplier defines criteria and mechanism/algorithm for detecting performance related problems**
- **Decision regarding how to respond is owned by the factory**
 - **May decide to disable some DCP's or continue running, depending on factory policy**

3509 Client Interface



- Specifies client interface
 - For asynchronous notification of data, performance warnings, and de-activation/hibernation of active DCP's

Basic operation (Hotplate)

States

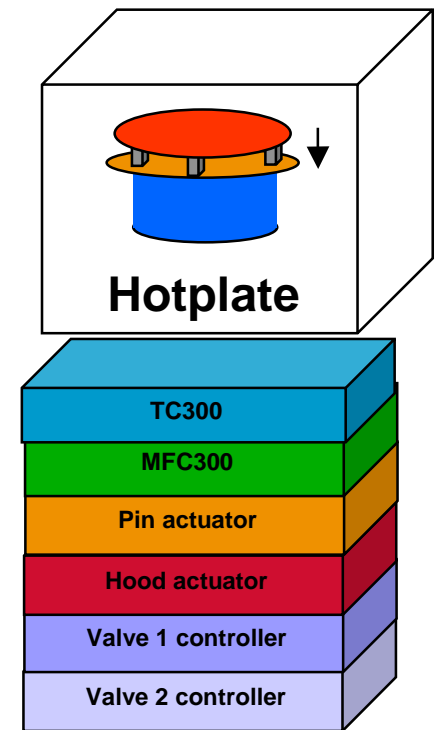
Hood open
Hood closed
Pins up
Pins down
Hot chuck occupied
Hot chuck unoccupied
Temperature adjusting
Temperature stable
Valve 1 open
Valve 1 closed
Valve 2 open
Valve 2 closed
MFC on
MFC off

Data

Hot chuck temperature
MFC flow rate
Valve 1 voltage
Valve 2 voltage
Pin actuator voltage

Programmable Parameters

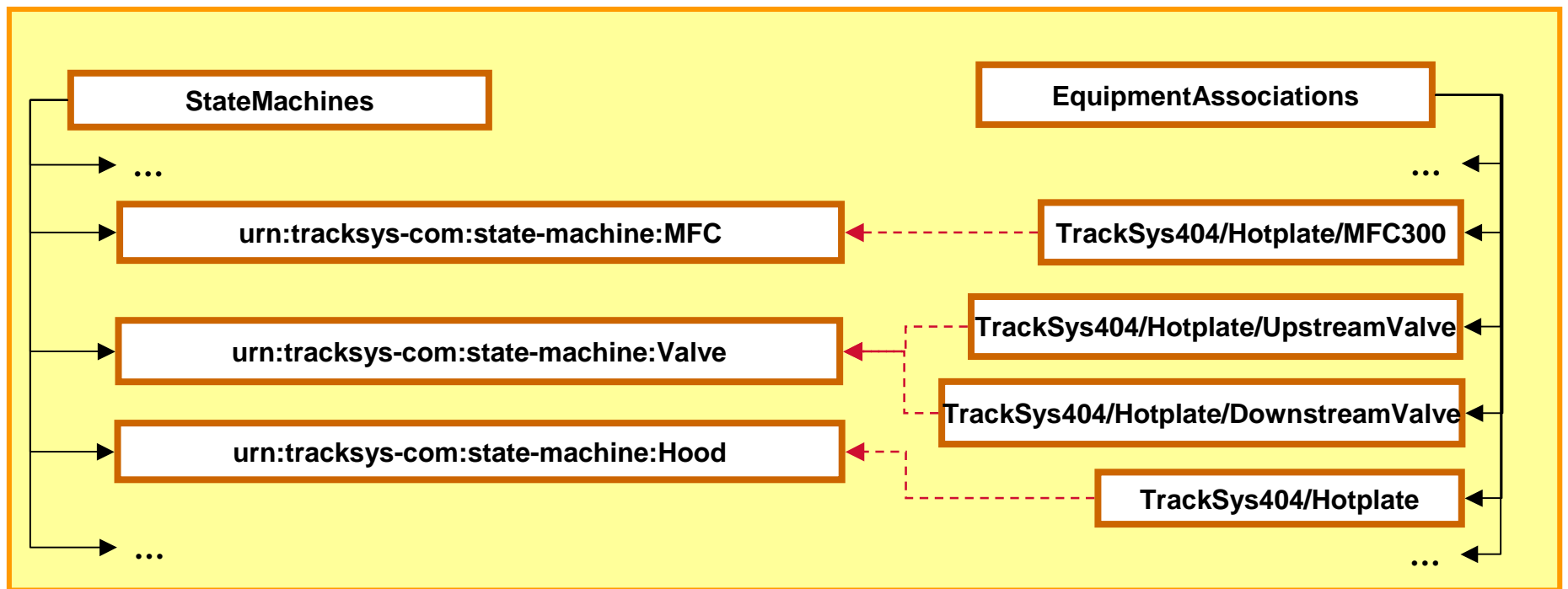
Hot chuck temperature
MFC flow rate
Bake time



- **Bake**

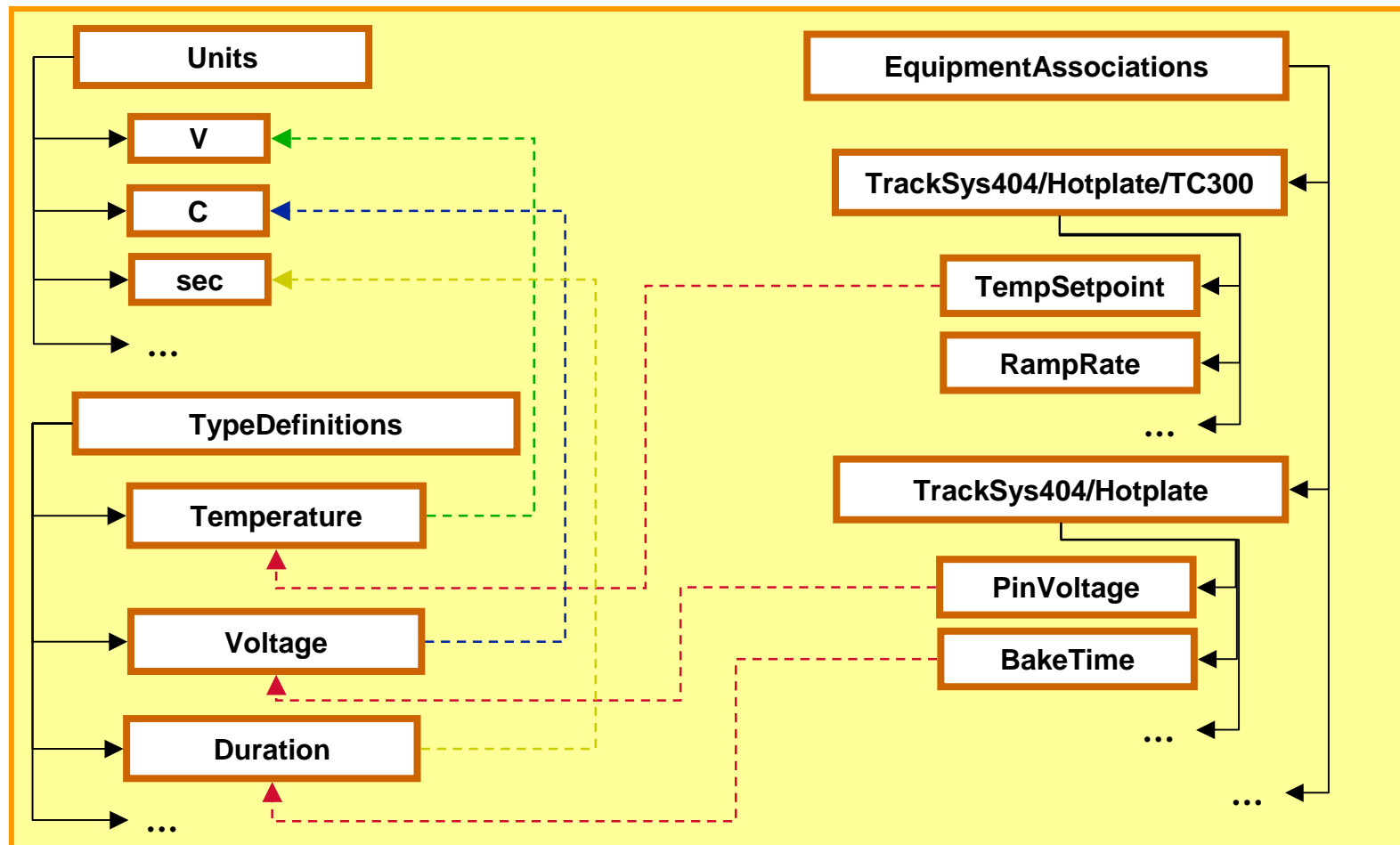
- Hotplate hood is closed
- Exchange pins retract, wafer rests on hot chuck
- MFC sets gas flow rate and valves are opened
- Temperature controller retains set temperature for set time
- Exchange pins lift to support wafer
- MFC reduces flow rate, Nitrogen valve is closed

Key E125 Metadata – State Machines



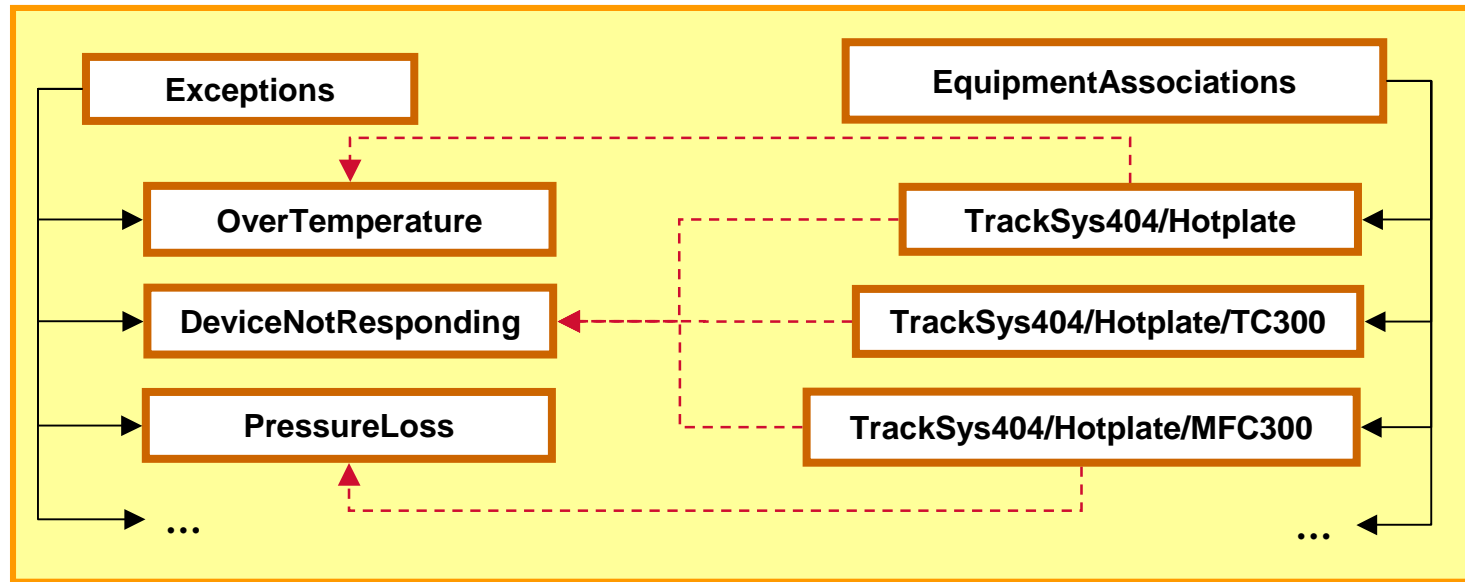
- The detailed behavioral models of each component of the hotplate module are of use for diagnostic purposes, many are useful for process control
- TrackSys designs the state machines and events that each component can track, and includes them in their metadata
- Each state machine is associated with its corresponding CEM node

Key Metadata – Parameters



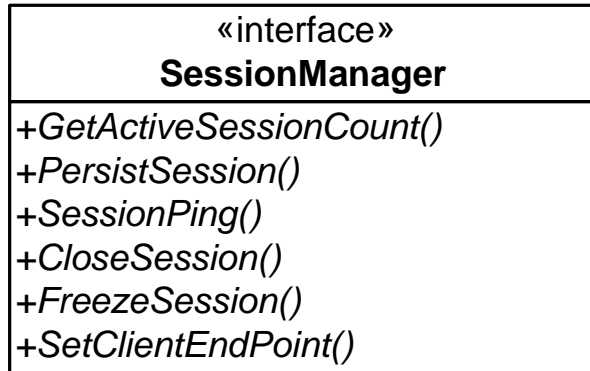
- Set points, physical data, configuration constants, etc. are modeled as parameters for each component of the hotplate
- TrackSys exposes control voltages used for diagnostic purposes

Key Metadata – Exceptions

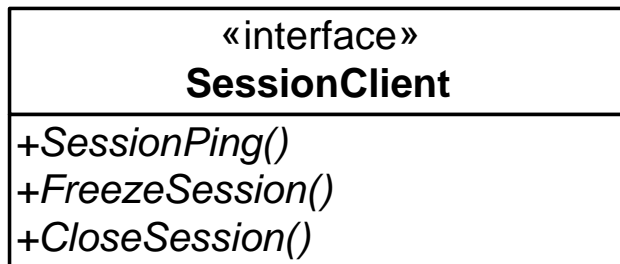


- Errors and alarms for each hotplate component are modeled as exceptions and associated with the CEM nodes that report them

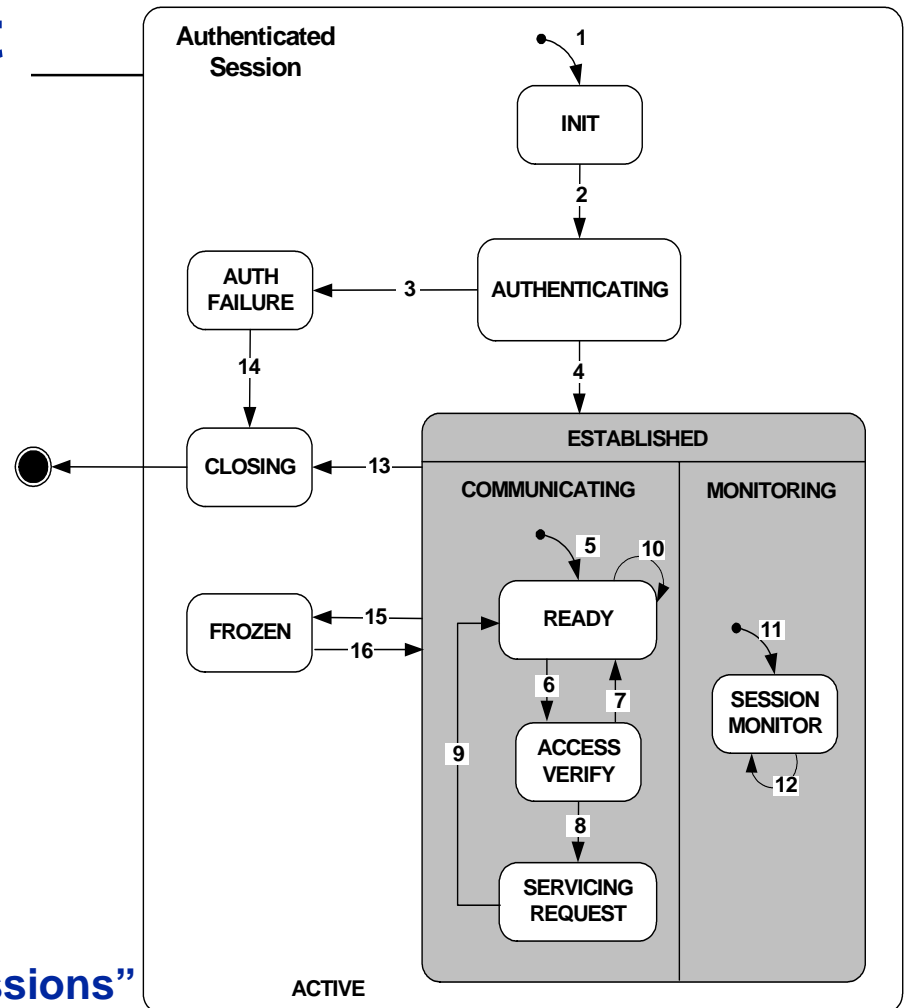
3507 Session Management



Implemented by Equipment



Implemented by Equipment Clients



- **Equipment communication scoped by “sessions”**
 - Session is created if client successfully authenticates
- **Client sends messages to begin and end sessions**
 - Admin (only) has privilege to end any client’s session
- **Sessions can be ‘persisted’ across shutdowns**
 - Facilitates notification to clients of equipment availability

E121 – XML Guide

- **Purpose**
 - Establish conventions for the usage of XML documents and schema within SEMI
- **Scope**
 - Recommendation to use XML Schema (not DTD's)
 - Usage of elements and attributes
 - XML element/attribute naming and case conventions
 - Conventions for common structures
 - Conventions for translating UML to XML Schema
- **Goals**
 - Address commonly occurring problems in XML design without being overly restrictive
- **Benefits**
 - Users of XML Schema produced by SEMI experience a consistent set of conventions employed in all specifications that make use of the technology



3507 – Authentication & Authorization

- **Purpose**

- Provide a means for factories to control, in software, which applications are permitted to communicate with the equipment
- Provide a means for factories to control, in software, which equipment services applications are permitted to use

- **Scope**

- EDA communication technologies only (SECS-II communication will not be addressed)

- **Implementation**

- To be specified in 3507.1
- Evaluating design options including SSL/X.509, SPKI, password-based schemes, etc.



3507 cont.

- **Goals**

- Support centralized administration of application credentials and ACL's
- Scale from single tool, single application to many tools many applications
- Authentication handshake must be efficient, preferably occurring only once during a communication session

- **Benefits**

- Help factory protect equipment from unauthorized data collection loads
- Help control the flow of equipment data by controlling legal clients
- Enable controls necessary to enforce factory single point of control policies



E120 – Common Equipment Model

- **Purpose**
 - Provide a means for suppliers to describe the physical structure of their equipment using common attributes and terminology
 - Provide a means for SEMI standards that depend on information about equipment structure to have a basis for doing so using common attributes and terminology
- **Scope**
 - Includes constructs for modeling linked equipment, multi-chamber equipment, etc. down to the actuator/sensor level.
- **Implementation**
 - Will define an XML Schema for the XML representation of these constructs in 3522.1



E120 cont.

- **Goals**

- Modeling construct for actuators/sensors should be consistent / compatible with established Sensorbus models
- Model should be flexible enough to accommodate all known equipment configurations including linked equipment
- Model should not specify any behavioral requirements of any equipment component

- **Benefits**

- Semiconductor industry will have a standard mechanism for describing physical equipment structure
- Provides a basis for enabling data collection targeted at specific equipment components
 - Useful in diagnostics, troubleshooting, utilization tracking, and process control applications



E125 – Equipment Self Description

- **Purpose**
 - Provide a means for applications to discover via software the physical equipment structure, available data items, events, and exceptions
- **Scope**
 - Includes type description, units, equipment structure (via CEM, 3522), supplier-defined and SEMI-defined state models and events, supplier-defined and SEMI-defined alarms and exceptions, SEMI ObjTypes (events and attributes only), data/configuration/control parameters
- **Implementation**
 - To be specified in 3510.1
 - Will define mapping for SOAP via HTTP, with interface specs defined in WSDL



E125 cont.

- **Goals**

- Data item, event, and exception descriptions should be compatible with the mechanism for requesting data via the 3509 specification
- Applications that comprehend SEMI standards should be able to discover, without human intervention, how suppliers have mapped standards into implementation for data collection
- Suppliers should be able to describe proprietary state models, data items, etc. that are unique to their equipment
- Descriptive information should be as simple as possible while still sufficient to describe data necessary to support diagnostics, monitoring, process control, etc.

- **Benefits**

- Enables automated data collection setup for SEMI-standard-compliant equipment
- Enables generic applications to provide “data menus” for engineers to assist in constructing data collection plans
- Enables an improved mechanism for keeping available tool data up-to-date over paper documentation



3509 – Data Collection Management

- **Purpose**
 - Provide a means for applications to organize all data needs (trace, exception, event) into logical, named units that can be individually activated and deactivated
- **Scope**
 - Data collection plan definition, DCP management interface, state models, data reporting formats
 - Event-driven “push” style data collection (events, traces, exceptions)
 - On-tool buffering of collected data
 - Equipment performance warnings
 - DCP management privilege model
- **Implementation**
 - To be specified in 3509.1
 - Will define mapping for SOAP via HTTP, with interface specs defined in WSDL



3509 cont.

- **Goals**

- DCP's should support a mechanism for identifying data/events/exceptions that is compatible with E125
- should be possible to control which clients are permitted to exercise which data collection functions
- DCP model should support data collection needs for diagnostic, health monitoring, utilization tracking, and process control applications
- Should support multiple independent clients
- Should permit data collection during equipment power-up

- **Benefits**

- Simplifies setup of data collection for all applications (one message to define, one to activate)
- Improves management of data collection needs through named DCP's
- Factory will be able to detect equipment performance issues that may be due to data collection loads
- Non real-time applications can utilize buffering features to collect data that need not be streamed



PR8-0303 – EDA Proposed Standard

- **Purpose**
 - Provide a means for the semiconductor industry to begin prototyping and early development of essential EDA concepts using the targeted technology
- **Scope**
 - Event-driven “push” style data collection (events and exceptions)
 - On-tool buffering of collected data is supported
 - Equipment performance warnings
 - DCP management via SOAP or SECS-II
- **Implementation**
 - Specified inline using SOAP1.1 and HTTP1.1
 - XML Schema and WSDL documents provided separately from the standard document itself



PR8-0303 cont.

- **Goals**

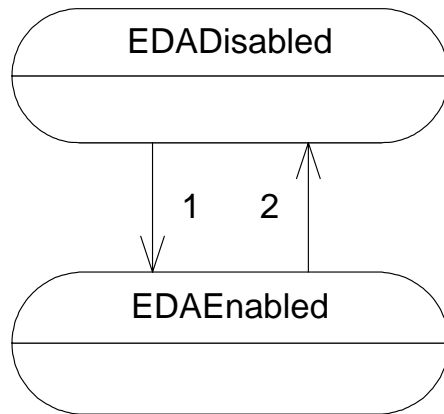
- Should be small in scope compared to the full suite of standards
- Should be based on target technologies
- Should be implement-able on the current generation of 300mm equipment
- Should provide features and concepts that are analogous to those defined in the long-term specifications
- Should include sufficient flexibility to permit experimentation and learning

- **Benefits**

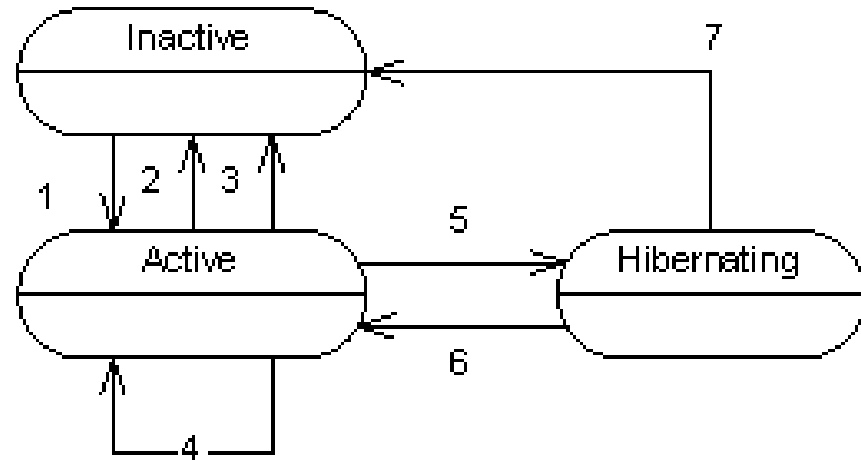
- Employs open, mainstream, industry standard technologies
- Enables the collection of data independently of the SECS-II interface
- Enables early adoption and prototyping of solutions based on EDA concepts
- Mitigates risk associated with transition to new technology and concepts



Port and DCP State Models



EDA port state model



DCP state model

- **Port state model**
 - Describes the accessibility of EDA communications
 - Analogous to 3507 description of communication state model
- **DCP state model**
 - Describes behavior of DCP's
 - Analogous to 3509 DCP state model

Data Management

```
<GetActivePlanIds xmlns="urn:semi.org:schema:eda_ps_v0.0">
  <EquipmentID>
    <Supplier>RoboFurnace, Inc.</Supplier>
    <Model>Zippo 355</Model>
    <ImmutableID>39d-JDII-Uj399</ImmutableID>
  </EquipmentID>
</GetActivePlanIds>

  <ActivatePlan xmlns="urn:semi.org:schema:eda_ps_v0.0">
    <EquipID>
      <Supplier>RoboFurnace, Inc.</Supplier>
      <Model>Zippo 355</Model>
      <ImmutableID>39d-JDII-Uj399</ImmutableID>
    </EquipID>
    <PlanID>DCP-72</PlanID>
    <UntilDeactivated>false</UntilDeactivated>
  </ActivatePlan>

<GetDefinedPlanIds xmlns="urn:semi.org:schema:eda_ps_v0.0">
  <EquipID>
    <Supplier>RoboFurnace, Inc.</Supplier>
    <Model>Zippo 355</Model>
    <ImmutableID>39d-JDII-Uj399</ImmutableID>
  </EquipID>
</GetDefinedPlanIds>

  <DeactivatePlan xmlns="urn:semi.org:schema:eda_ps_v0.0">
    <EquipID>
      <Supplier>RoboFurnace, Inc.</Supplier>
      <Model>Zippo 355</Model>
      <ImmutableID>39d-JDII-Uj399</ImmutableID>
    </EquipID>
    <PlanID>DCP-72</PlanId>
  </DeactivatePlan>
```

- **Specifies data management messages**
 - **Formats conceptually described in PR8-0303 document, XML Schema and WSDL provided separately**
 - **Operations analogous to DCP management interface in 3509**
 - **Data management (only) also supported via SECS-II**
 - **DCP definition/deletion messages not specified**
- **Implemented by Equipment**

Data Reports

- Specifies data reporting format
 - Described conceptually in document, XML Schema and WSDL provided separately
 - Supports strong typing of single-valued and structured data
 - Supports on-tool buffering
- Format is different from 3509
 - Because DCP format is not specified in PR8-0303
- Implemented by EDA Clients



```
<EdaData xmlns="urn:semi.org:schema:eda_ps_v0.0">
  <EquipmentID>
    <Supplier>RoboFurnace, Inc.</Supplier>
    <Model>Zippo 355</Model>
    <ImmutableID>39d-JDII-UJ399</ImmutableID>
  </EquipmentID>
  <Event>
    <EventTime>2002-09-22T04:19:50.000000-07:00</EventTime>
    <Locator>Furnace</Locator>
    <EventID>TempSetpointReached</EventID>
    <Data>
      <Param>
        <Locator>Furnace.Chamber-1.Heater</Locator>
        <Name>Temperature</Name>
        <Value>
          <DoubleVal>44.203647416413375</DoubleVal>
        </Value>
      </Param>
      <Param>
        <Locator>Furnace.Chamber-2.Heater</Locator>
        <Name>Temperature</Name>
        <Value>
          <DoubleVal>4424.4468085106382</DoubleVal>
        </Value>
      </Param>
    </Data>
  </Event>
  <ExEvent>
    <ExTime>2002-09-22T04:31:43.414000-07:00</ExTime>
    <Locator>Furnace.Chamber-2.Heater</Locator>
    <ErrorCode>45144</ErrorCode>
    <ExType>Alarm</ExType>
    <ExState>Set</ExState>
    <ExDesc>Chamber 2 is overflowing with Nitrogen. Help.</ExDesc>
    <Data>
      <Param>
        <Name>N2-Flow</Name>
        <Value>
          <DoubleVal>45.126934984520126</DoubleVal>
        </Value>
      </Param>
    </Data>
  </ExEvent>
</EdaData>
```

Equipment Performance Warning

```
<EdaError xmlns="urn:semi.org:schema:eda_ps_v0.0">
  <EquipID>
    <Supplier>RoboFurnace, Inc.</Supplier>
    <Model>Zippo 355</Model>
    <ImmutableID>39d-JDII-UJ399</ImmutableID>
  </EquipID>
  <Error>
    <ErrorTime>2002-09-22T02:22:14.3220000-07:00</ErrorTime>
    <ErrorType>PerformanceWarning</ErrorType>
    <ErrorCode>Performance.Subsystem</ErrorCode>
    <ErrorDesc>Chamber 4 overheating by 6 degrees Celsius</ErrorDesc>
  </Error>
</EdaError>
```

- **Specifies performance warning message**
 - **Factory decides how to respond**
 - **Supplier defines performance criteria**
 - **Conceptually analogous to 3509 warnings**
 - **Format differs from 3509**
 - **Because of reduced scope of 3563**
- **Implemented by EDA clients**



EDA Port Availability

```
<EdaEnabled xmlns="urn:semi.org:schema:eda_ps_v0.0">  
  <EquipID>  
    <Supplier>RoboFurnace, Inc.</Supplier>  
    <Model>Zippo 355</Model>  
    <ImmutableID>39d-JDII-UJ399</ImmutableID>  
  </EquipID>  
</EdaEnabled>
```

```
<EdaDisabled xmlns="urn:semi.org:schema:eda_ps_v0.0">  
  <EquipID>  
    <Supplier>RoboFurnace, Inc.</Supplier>  
    <Model>Zippo 355</Model>  
    <ImmutableID>39d-JDII-UJ399</ImmutableID>  
  </EquipID>  
</EdaDisabled>
```

- **Notifies clients of accessibility**
 - **Asynchronous notification when EDA port availability changes**
- **Implemented by EDA clients**

