

Interface A Guidance

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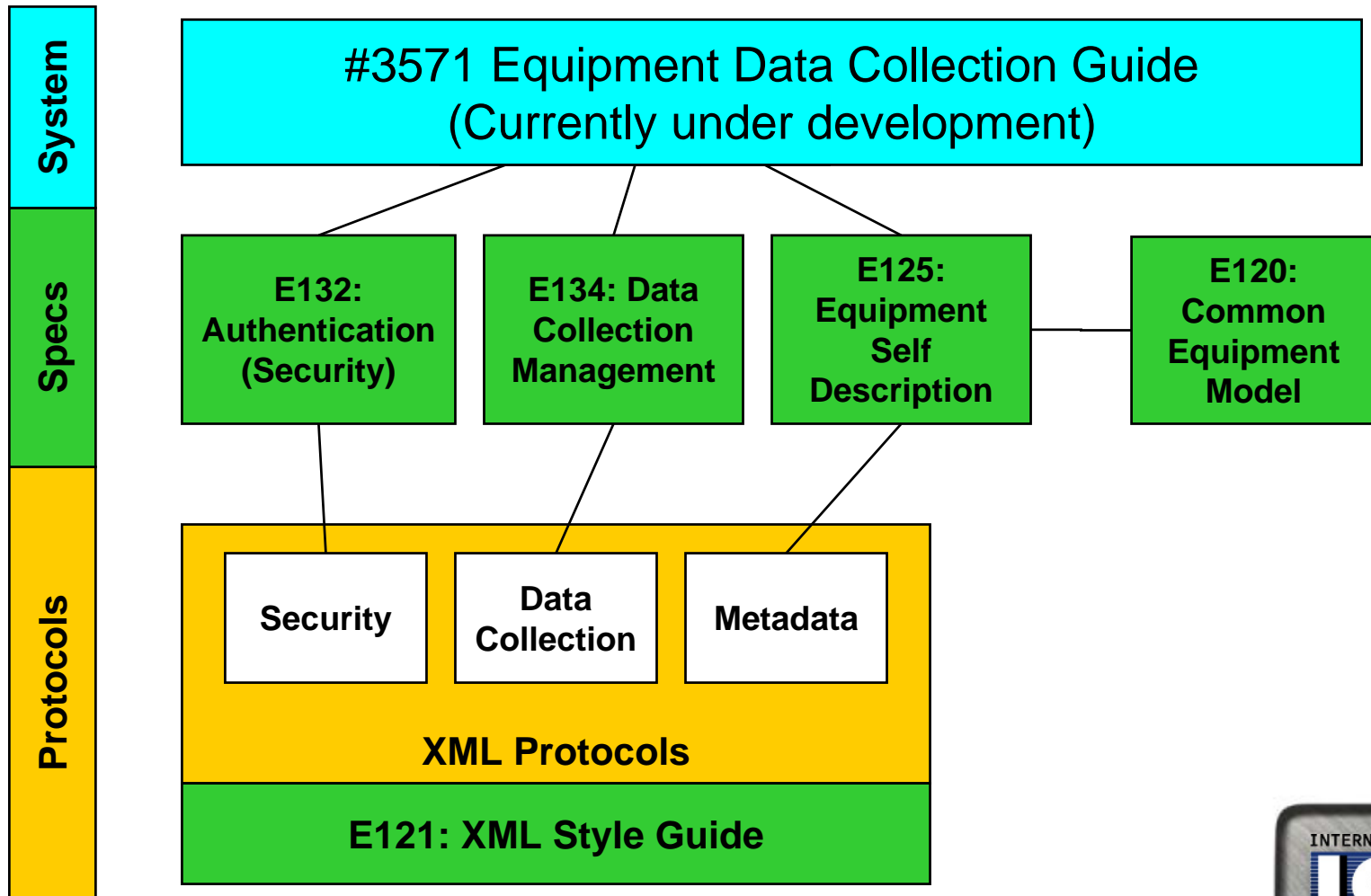
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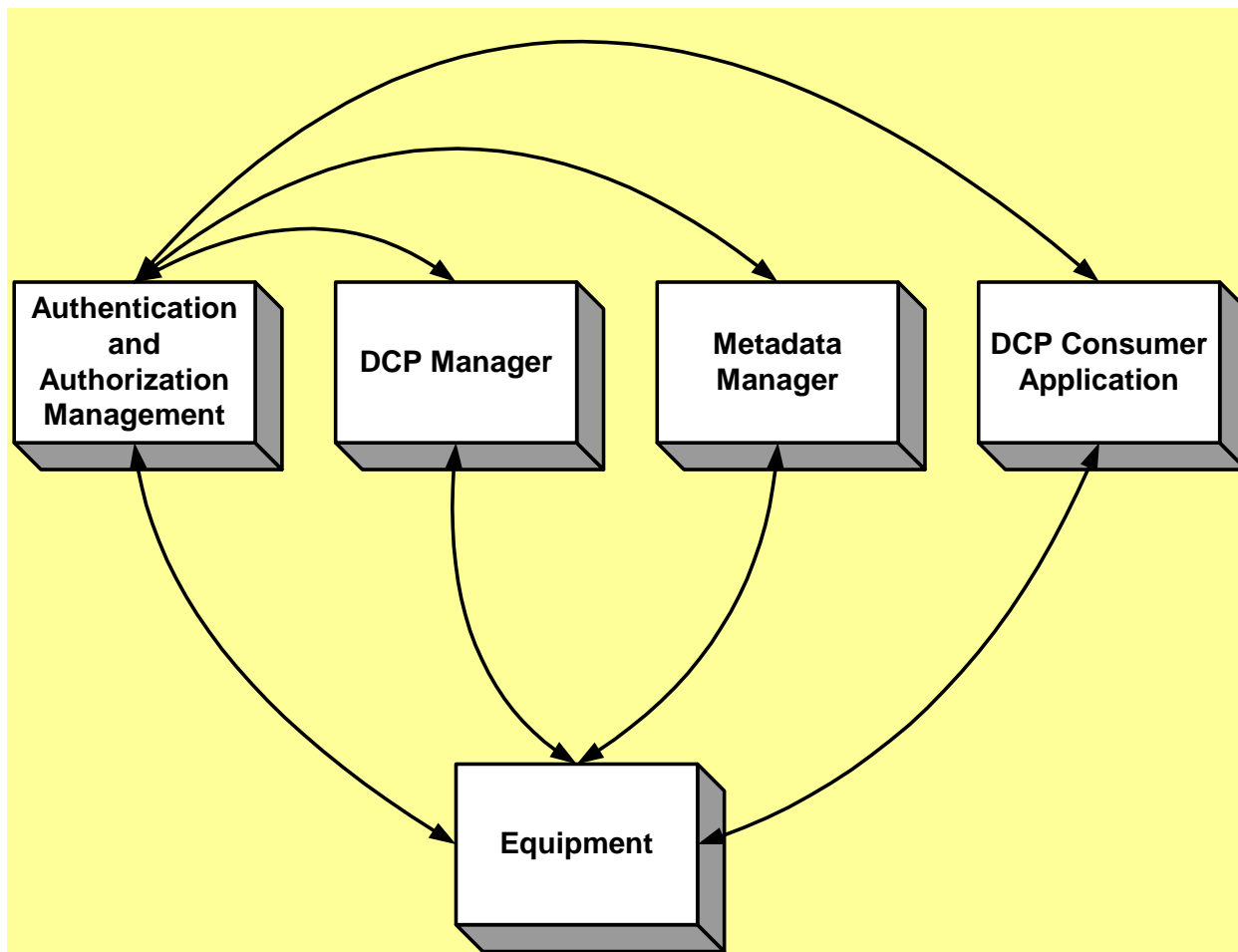
Equipment Data Acquisition (EDA) Usage Guidance

- **EDA Standards**
- **Certificate and ACL Management**
- **Metadata Management Requirements**
- **DCP Management and DCP Support**
- **EDA Usage Scenarios**
- **EDA Evaluation Method**

SEMI EDA Standards

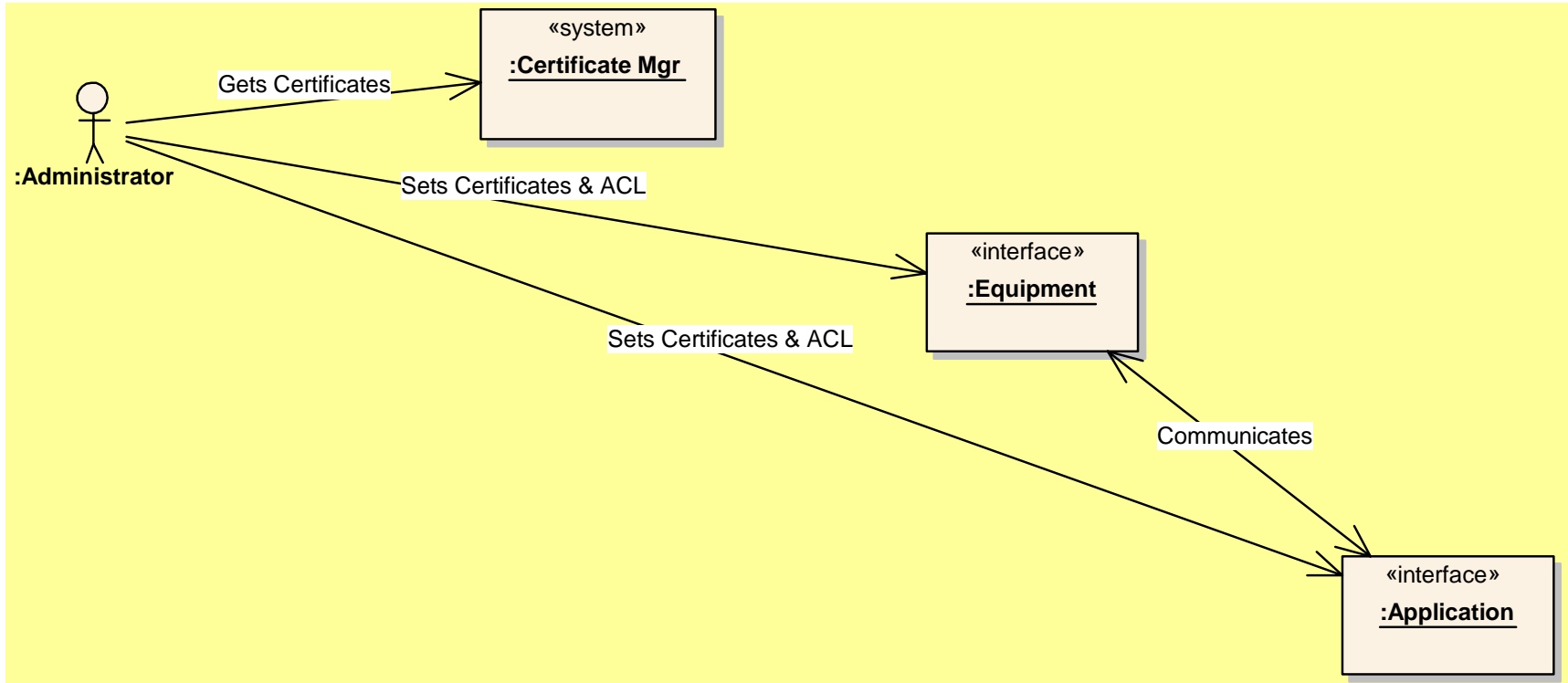


High Level View of EDA Applications



- ❑ Multiple client applications are expected to coexist at the factory level
- ❑ Equipment is responsible to communicate with each client independently
- ❑ Some of these client applications may be implemented on separate servers
- ❑ IC maker responsible for designing its own architecture to optimize the management or data

Certificate Management



Administrator (ICM) responsible of setting up equipment and factory applications:

1. **Certificate distribution**
2. **Access Control List Management**
3. **Session Management**

E132 – Authentication & Authorization

■ Purpose

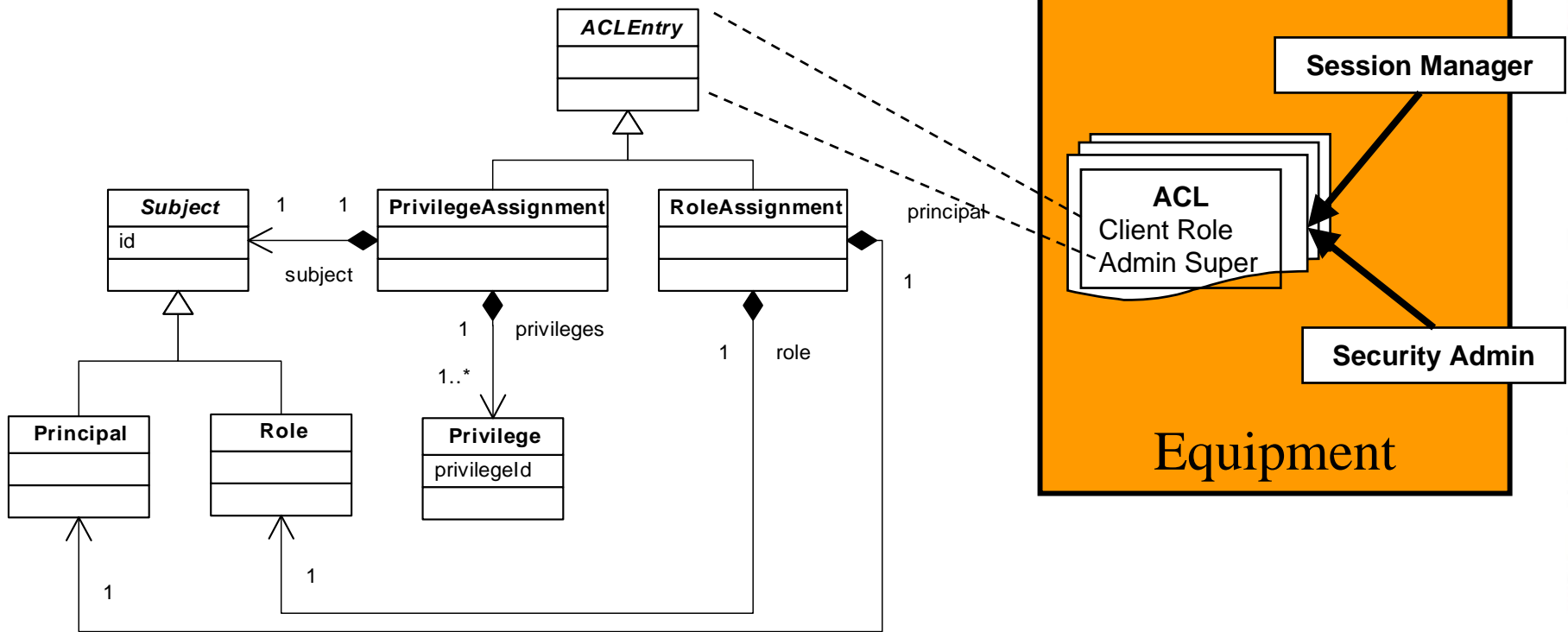
- Provide a means for factories to control, in software, which applications in the factory are permitted to communicate with the equipment
- Provide a means for factories to control, in software, which equipment services factory applications are permitted to use

■ Scope

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



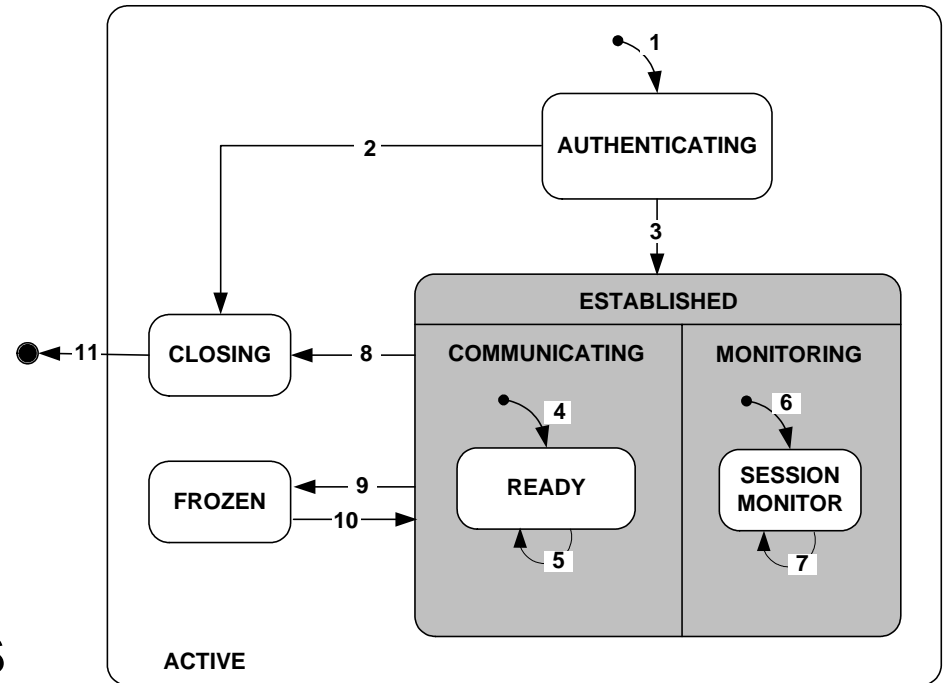
E132 Authorization Model



- **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

E132 Session Management

- **Equipment communication scoped by “sessions”**
 - **Session is created if client successfully authenticates**
- **Client sends messages to begin and end sessions**
 - **Only the administrator has the privilege to end any client’s session**
- **Sessions persist across shutdowns**
 - **Facilitates notification to clients of equipment availability**



E120 – Common Equipment Model

- **Purpose**

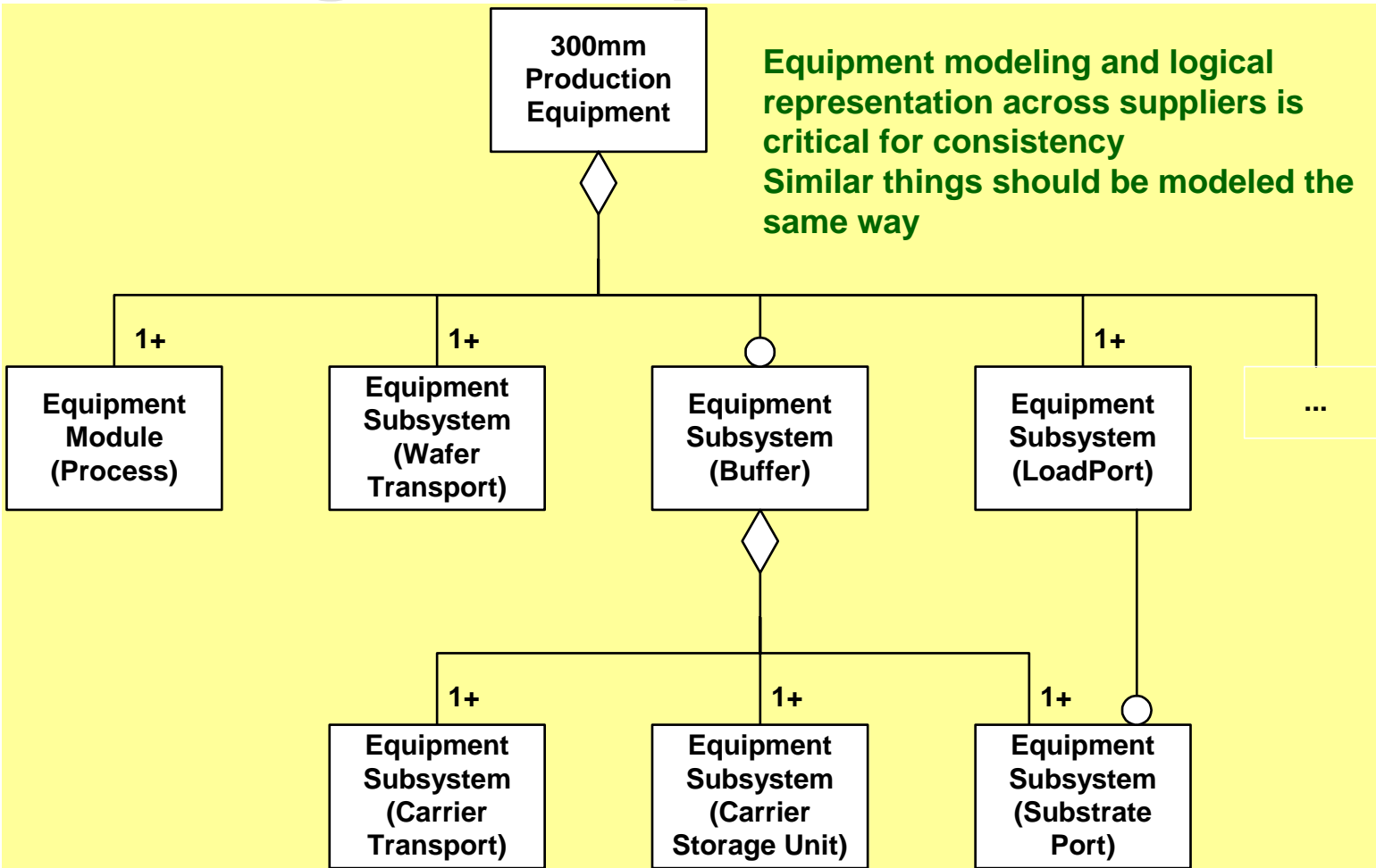
- Provide a means for suppliers to describe the physical structure of their equipment using common attributes and terminology
- Provide a means for SEMI standards that depend on information about equipment structure to have a basis for doing so using common attributes and terminology

- **Scope**

- Includes constructs for modeling linked equipment, multi-chamber equipment, etc. down to the actuator/sensor level



SEMI E120 – Equipment Modeling and Logical Representation



E125 – Equipment Self Description

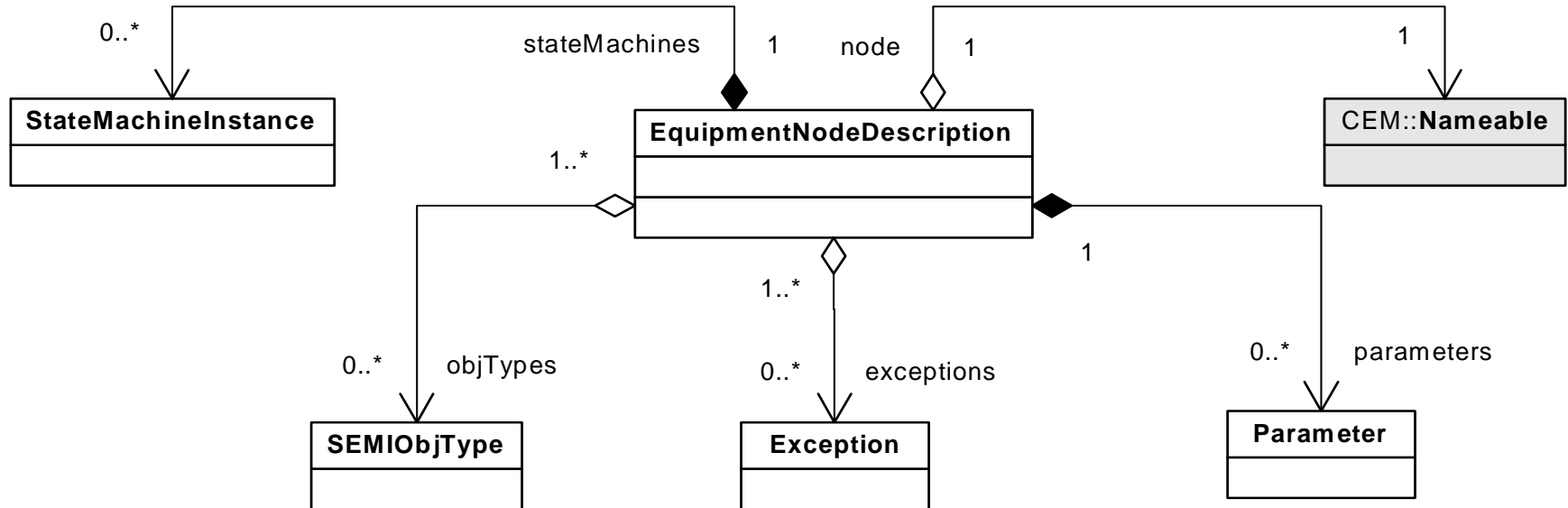
- **Purpose**

- 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, E120), 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

Equipment Node Description



- **CEM::Nameable** identifies the CEM node being described as defined by the equipment modeling
- Each **“node”** holds Parameters, Exceptions, SEMIObjTypes, and StateMachineInstances
- Each **node association** needs to hold similar type of items from equipment to equipment representation
- **Consistency** is key for factory DCP applications

E134 – Data Collection Management

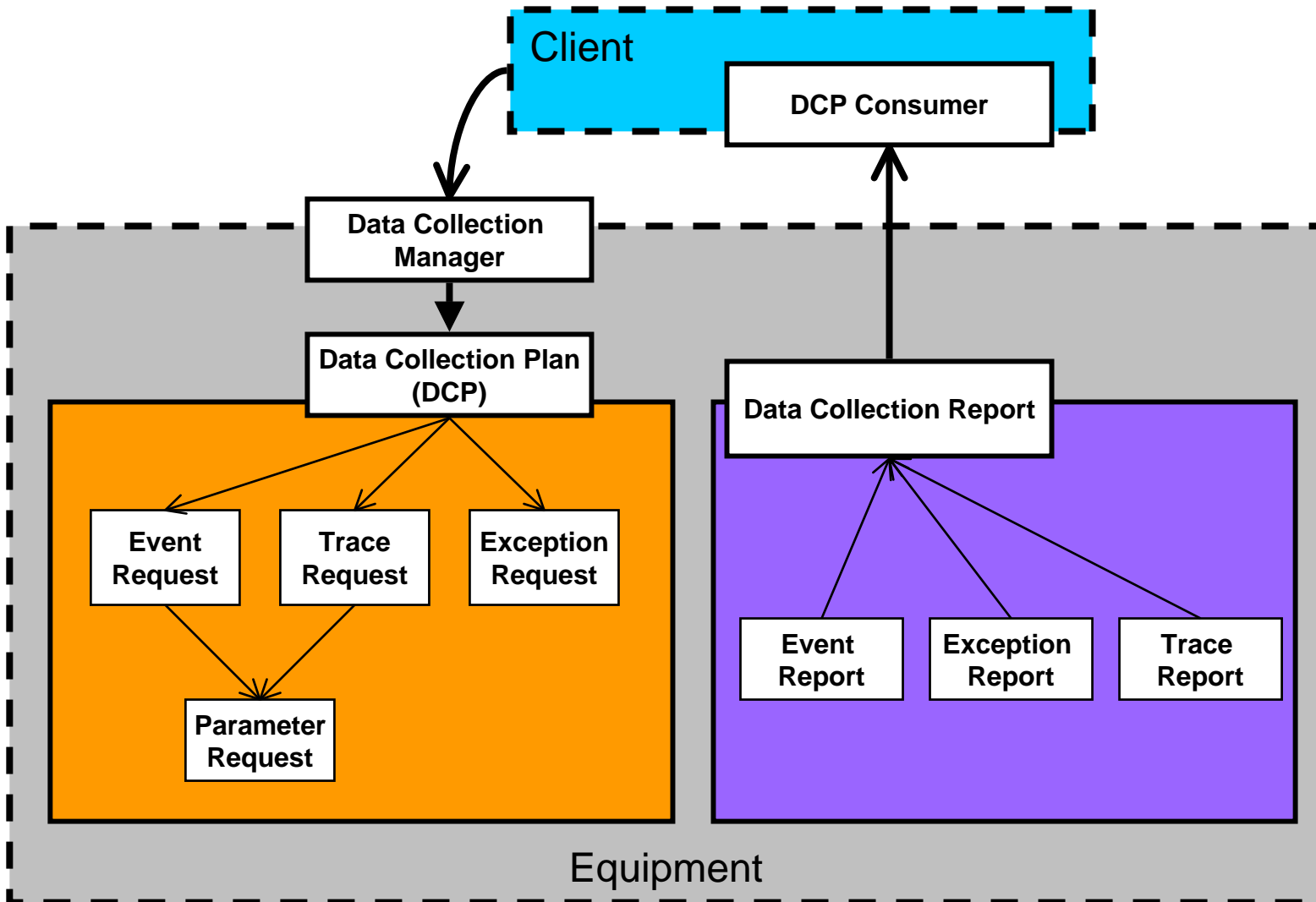
- **Purpose**

- 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-demand data collection
- On-tool buffering of collected data
- Equipment performance warnings
- DCP management privilege model

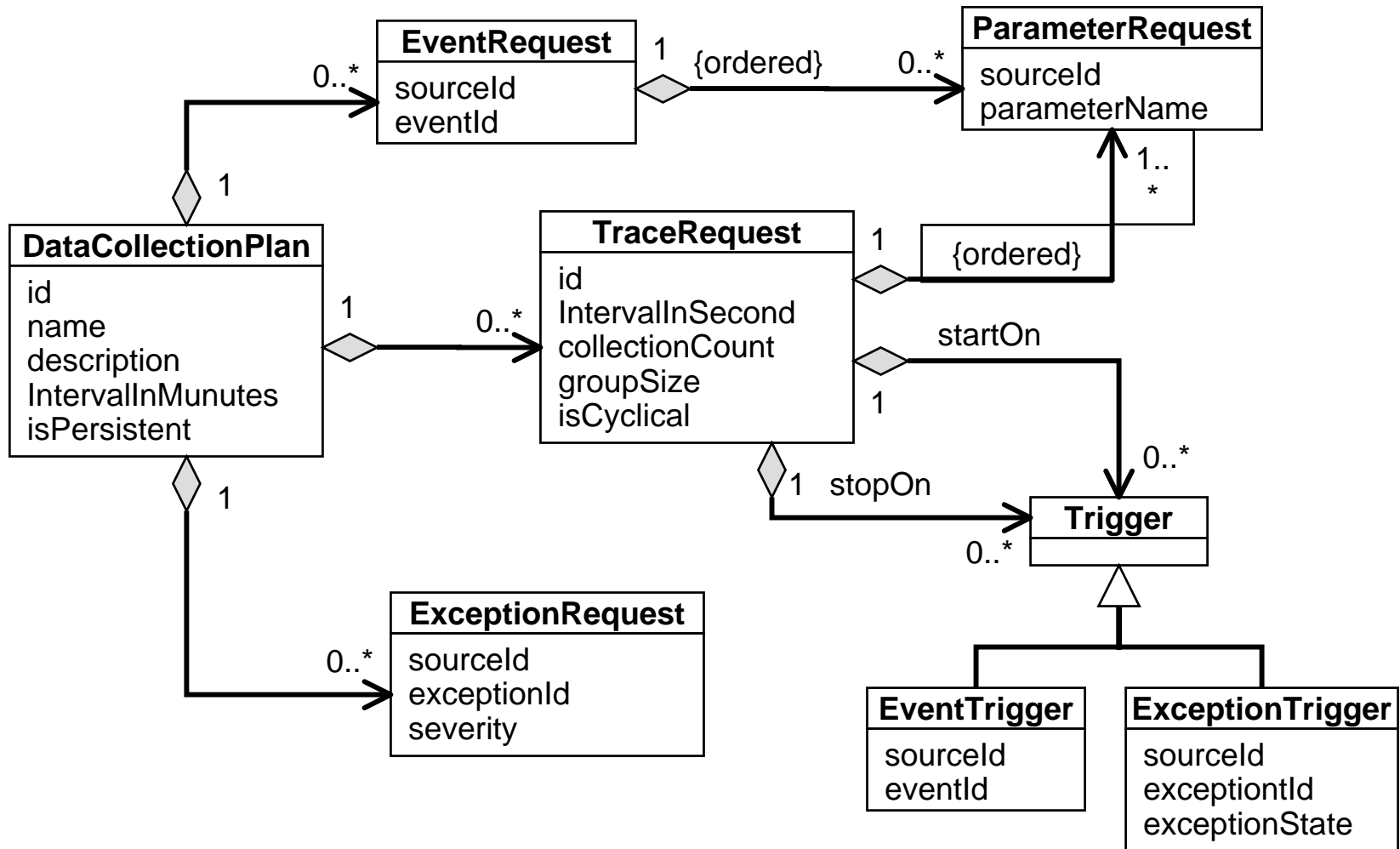
Data Collection – Overview



Built-in DCP

- Equipment supplier can provide pre-defined DCP's that are included with the equipment, and don't require definition by the consumer
- Built-in DCP's can be activated and viewed by any client using ActivatePlan and GetPlanDefinition
- Built-in DCP's cannot be deleted by any consumer
- Some Build in DCP's are intended for performance measurement
 - *Trace cyclical DCP's with group sizes of 1, 100, 500, 1000 at maximum rates should be provided*

DCP – Data Collection Plan



EDA Usage Scenarios

- **Purpose**

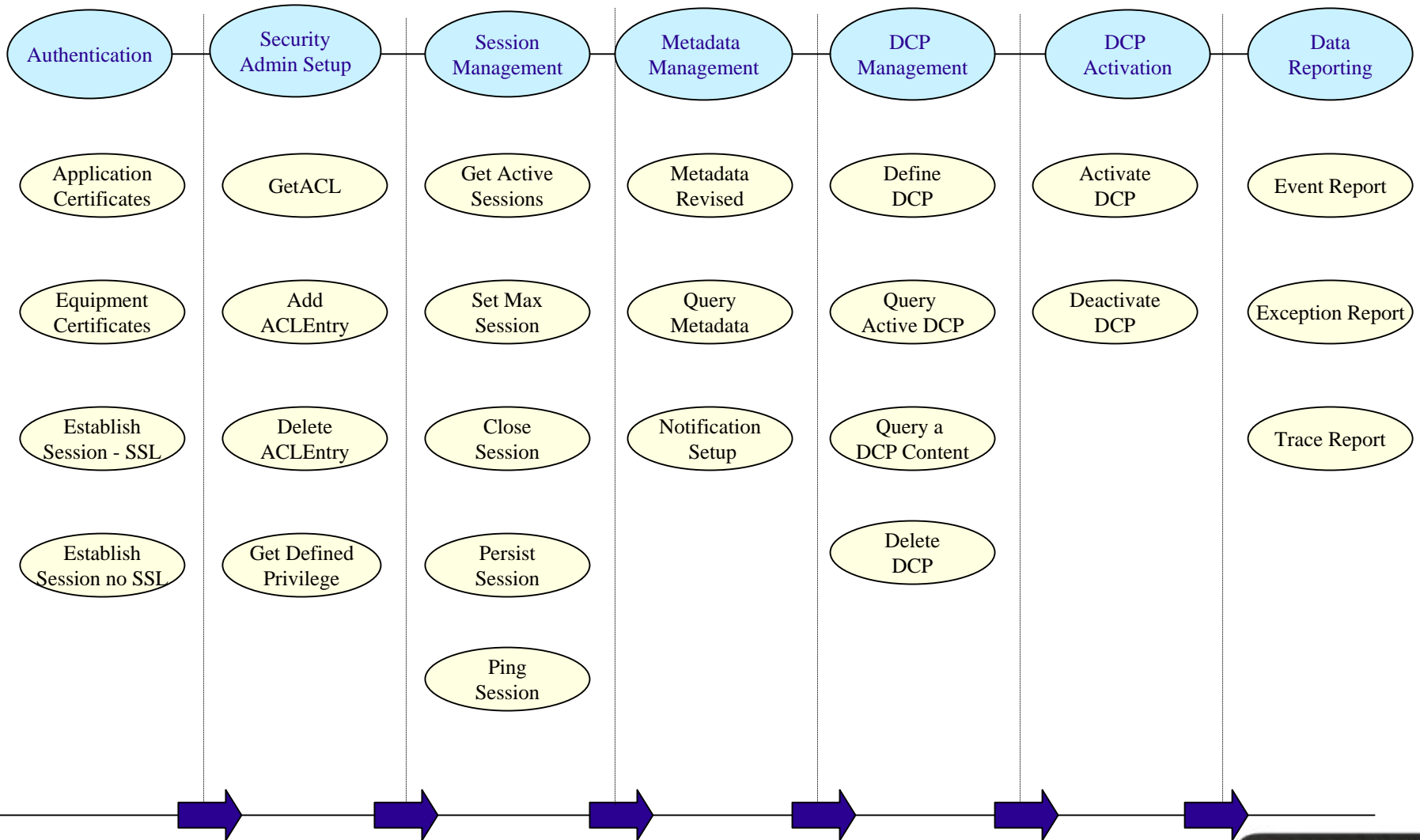
- ISMI Usage Scenarios are intended to represent the member company consensus production fab use models. They will establish expected behavior sequences and provide guidance for suppliers during implementation of the functions and requirements in the standards. Usage Scenarios also bound the space of interest for conformance and validation testing.

- **Output**

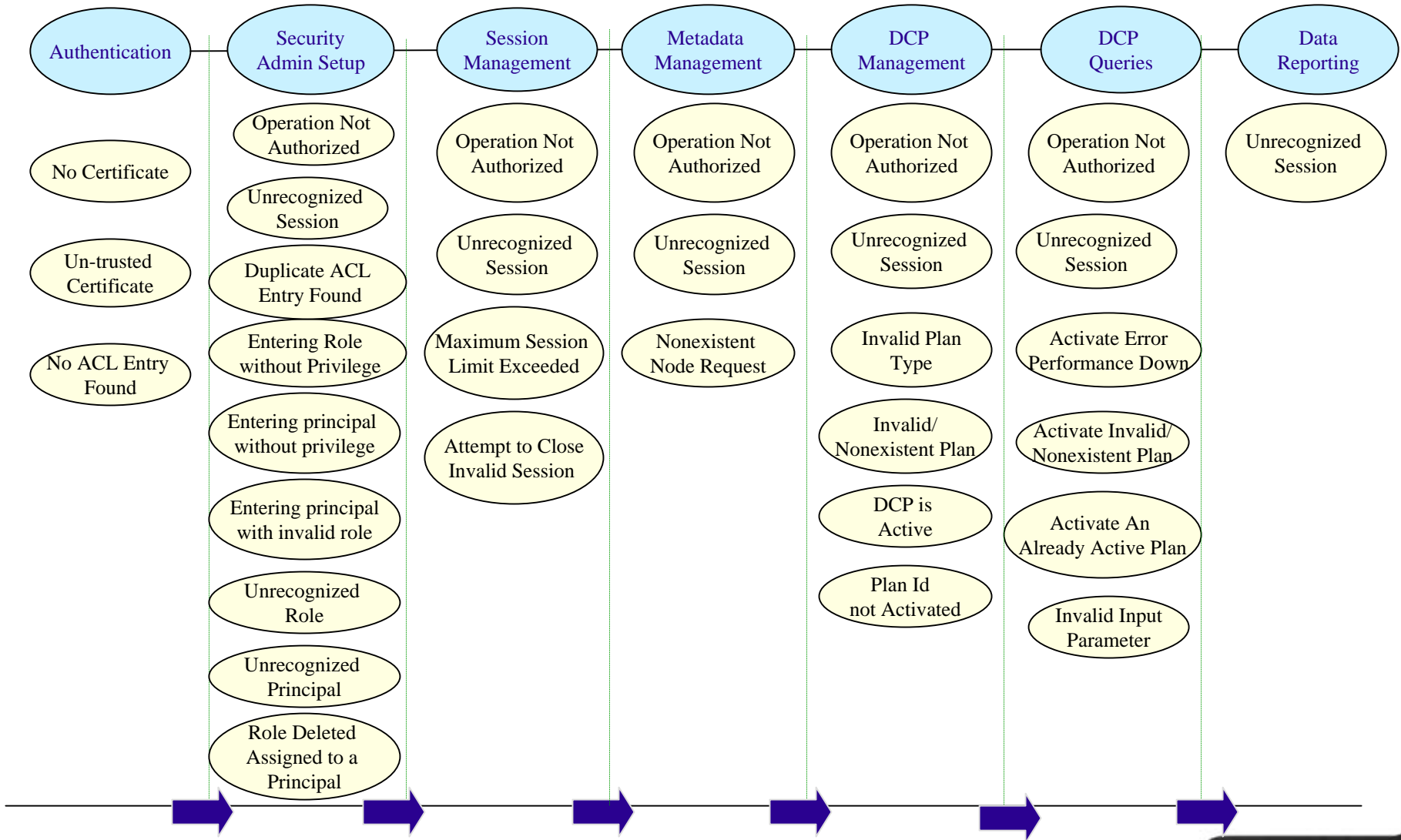
- **Interface A Usage Scenarios for Production Fabs document**

Usage Scenarios: 04104579B-TR
ismi.sematech.org/docubase/abstracts/4579btr.htm

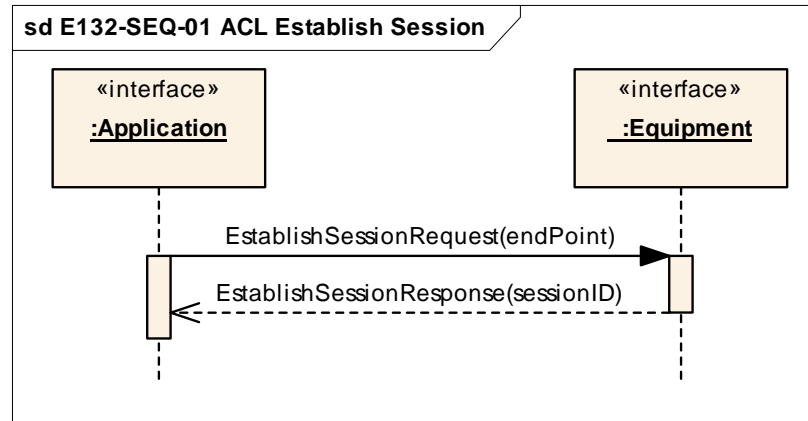
EDA Normal Cases



EDA Exception Cases



E132-SEQ-01 Establish Session Request Service



- **Normal Case**

- E132-SEQ-01.1 Application has a valid certificate and ACL entry
- Equipment not using SSL is just a special case where the equipment skips or ignores the low level Authentication
- **Authorization still applies (ACL Entry is required)**

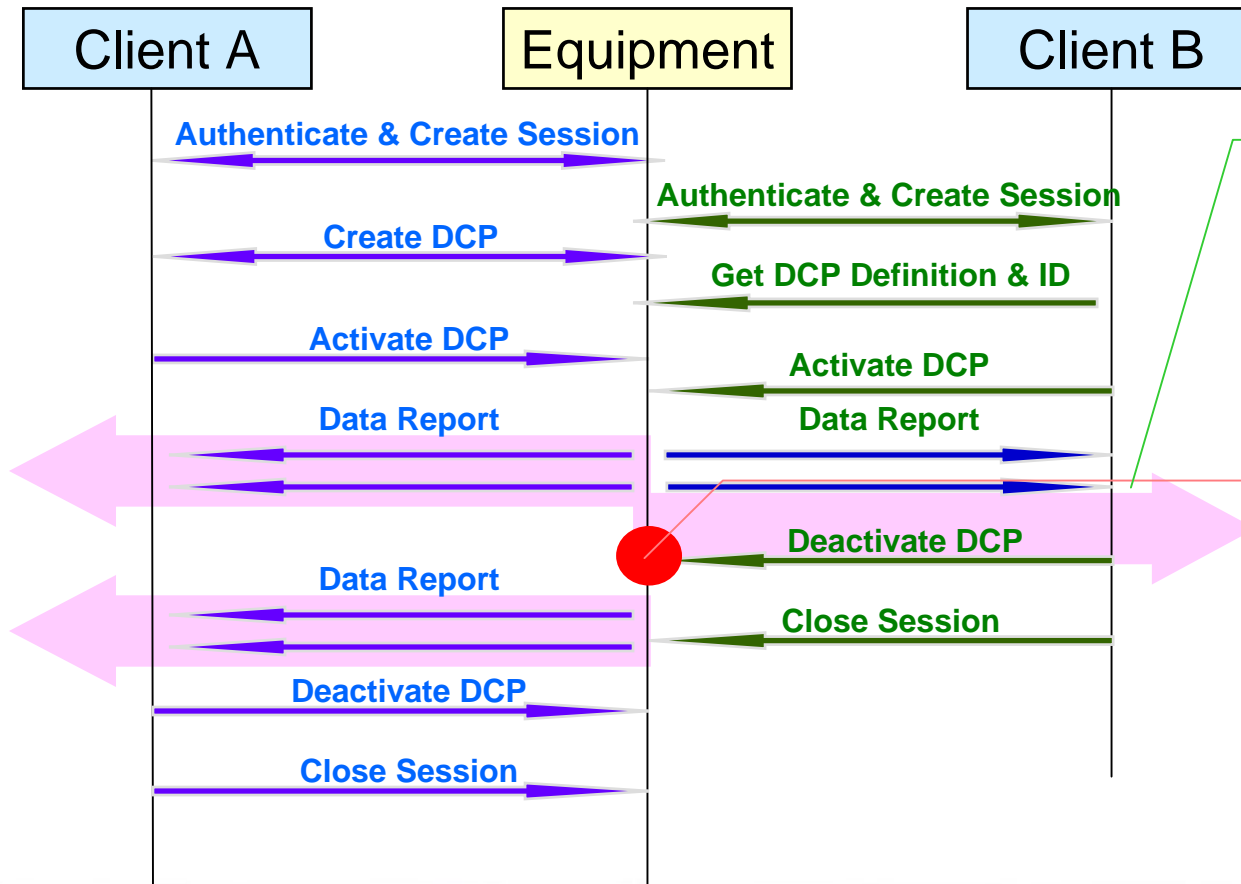
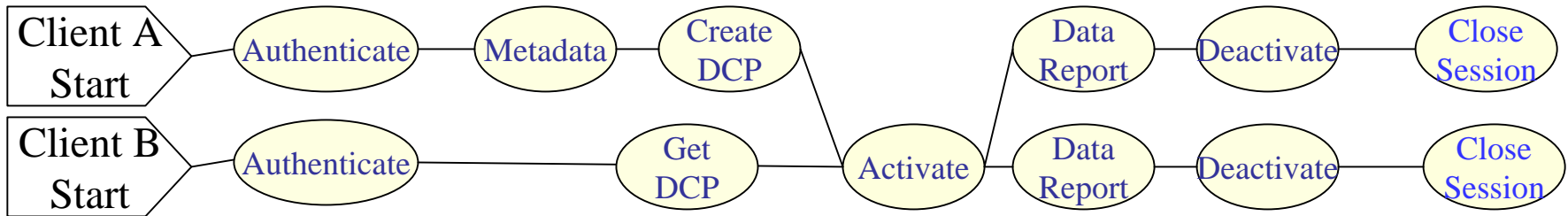
- **Exception Cases**

- E132-SEQ-01.2 Application does not have a certificate at all (w SSL enabled)
- E132-SEQ-01.3 Application with a certificate that is not trusted
- E132-SEQ-01.4 No ACL entry

- **Scenario**

- E132-SCN-01 SSL Configuration Change Scenario

SCN-03 Multiple Client Single DCP

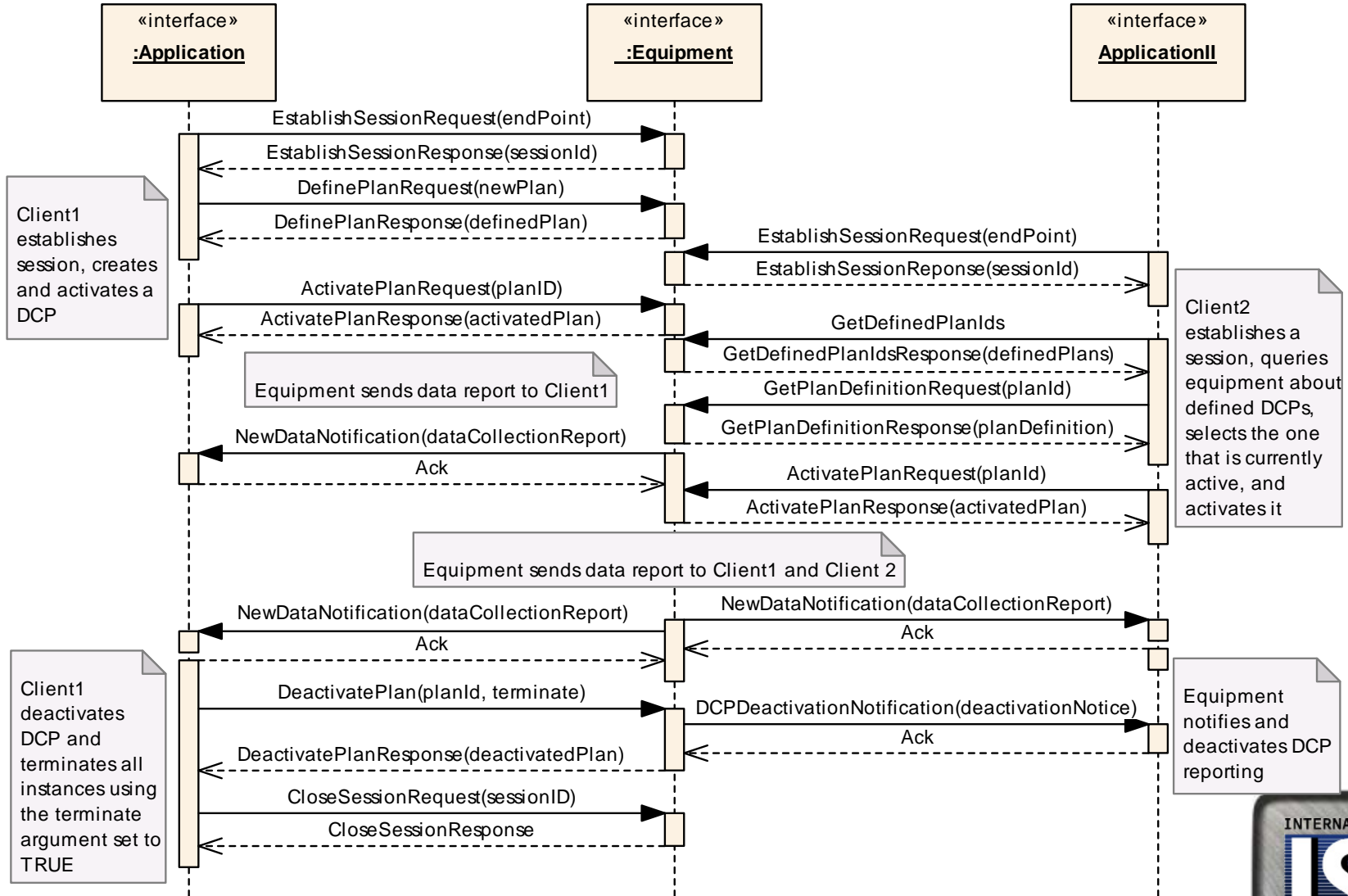


Only one data report sent out from EQP to many clients at the same time.

The DCP can not be deactivated until the last client sent deactivate DCP message.

SCN-05 DCP Deactivation with more than one Client Receiving Data (Terminate=True)

sd SCN-05 DCP Deactivation with More than One Client Receiving Data



Conclusion

- There are **more than one** client applications on the factory side that will interact with the equipment
- **Certificate, authorization, and session management** will be needed separately
- **Consistent equipment representation** critical for storing metadata information and DCP creation
- **Performance DCPs** will be required from equipment suppliers for the host to verify the required performance expectations
- **EDA Guide, EDA Usage scenarios, EDA Evaluation Method** are some of the guidance documents being made available by SEMI and ISMI