

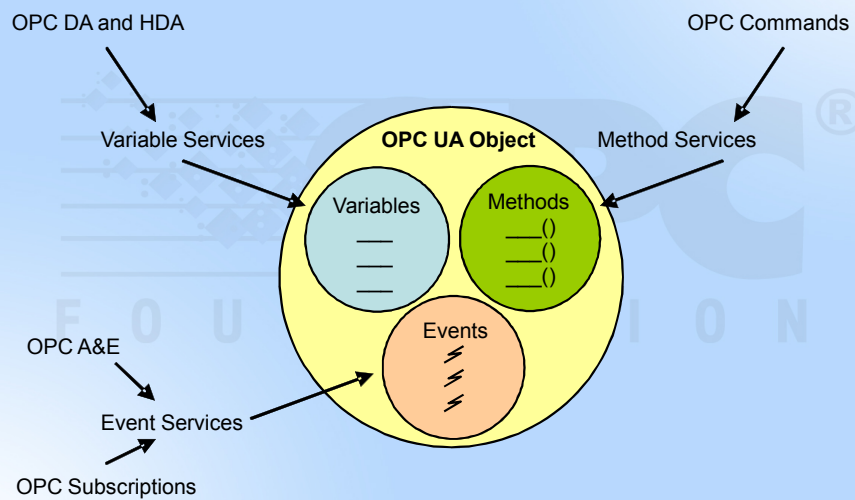
OPC UA Information Modeling

OPC and MES Day 2012

OPC and MES Day 2012



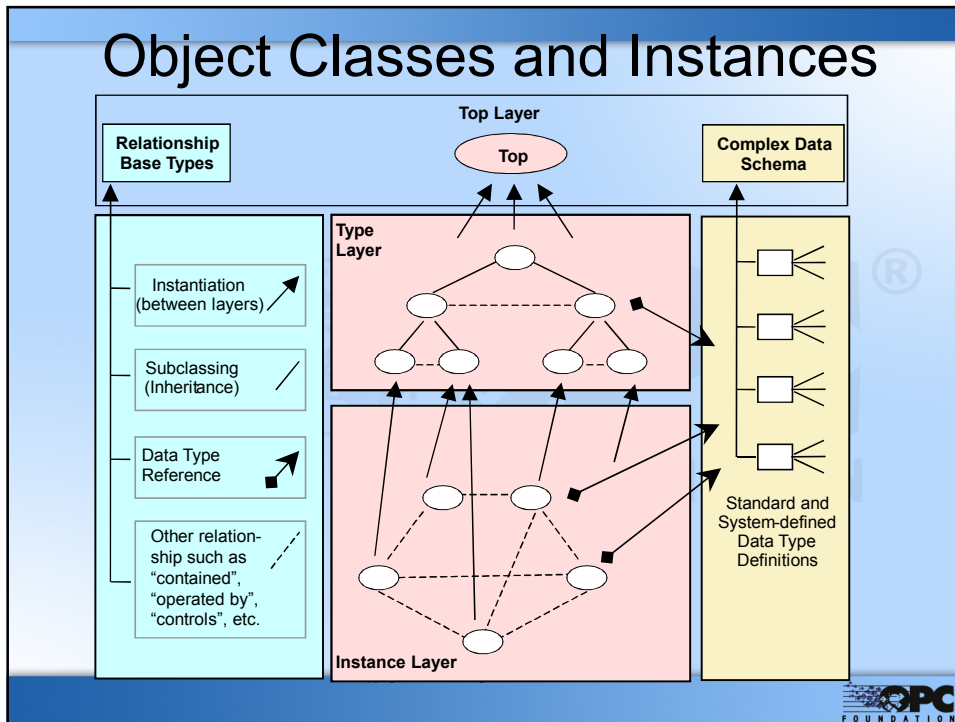
Unified Object Model



OPC and MES Day 2012



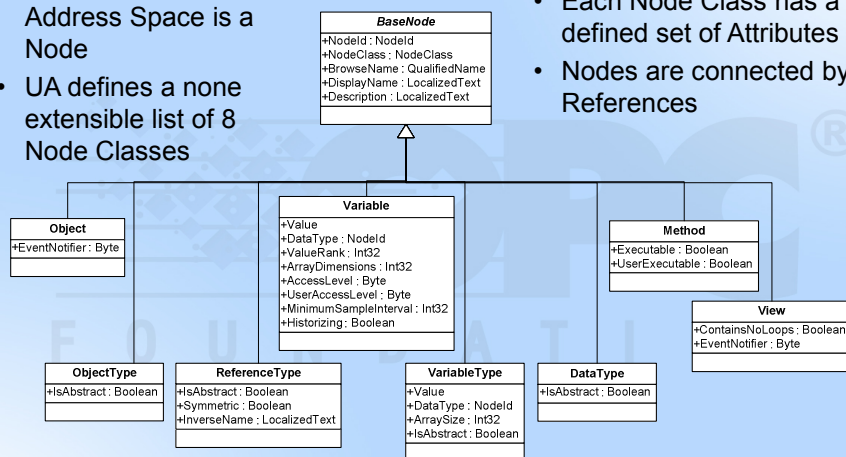
Object Classes and Instances



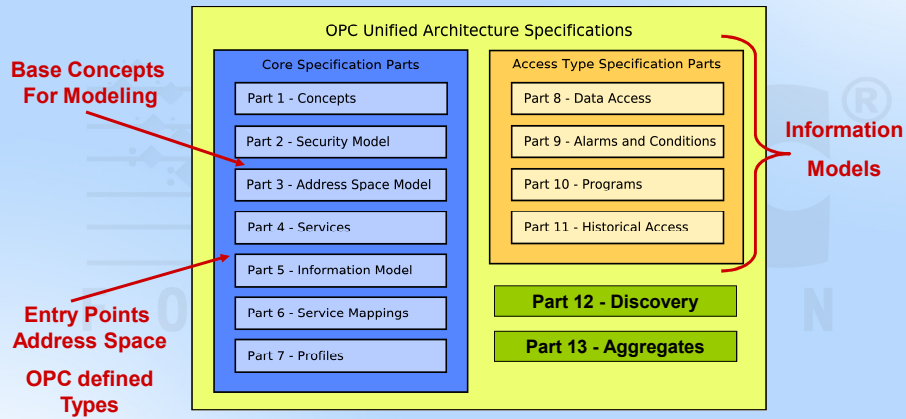
Nodes and References

- Everything in the UA Address Space is a Node
- UA defines a none extensible list of 8 Node Classes

- Each Node Class has a defined set of Attributes
- Nodes are connected by References



Modeling in Specifications

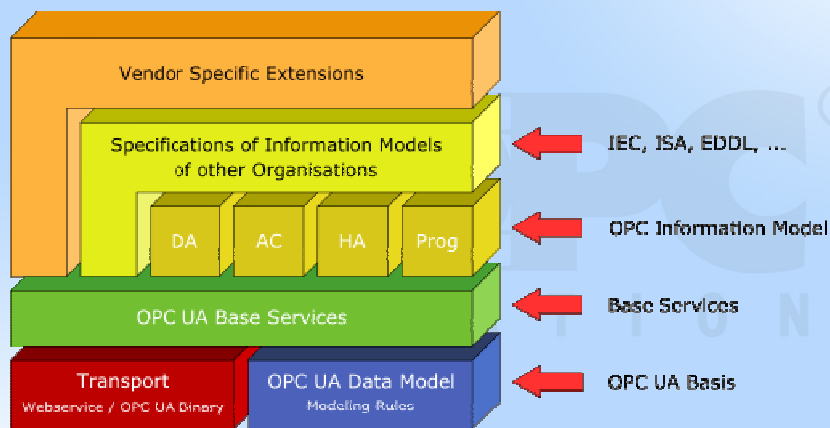


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OPC UA

- Modeling of Data

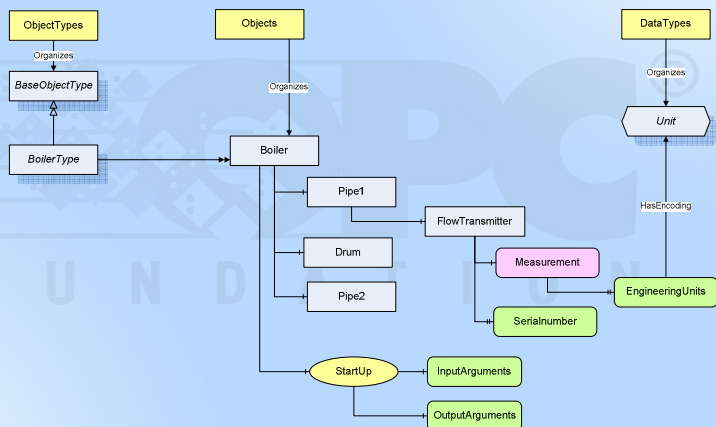


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Node Classes

- Object
- Object type
- Variable
- Variable type
- Data Type
- Method
- Reference
- View

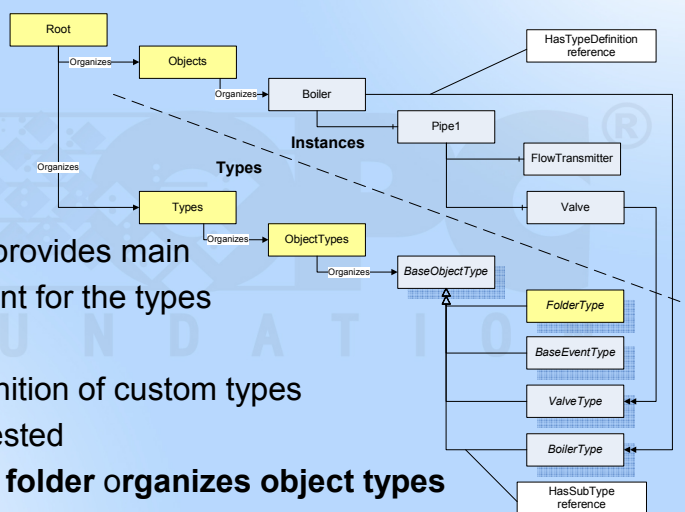


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Object Type Node Class

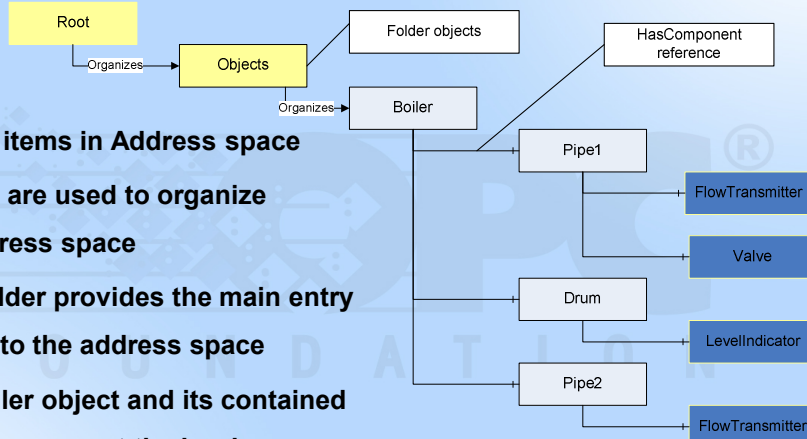
- ▶ **Types folder provides main entry point for the types**
- ▶ **ObjectTypes**
 - Allow definition of custom types
 - Can be nested
- ▶ **ObjectTypes folder organizes object types**



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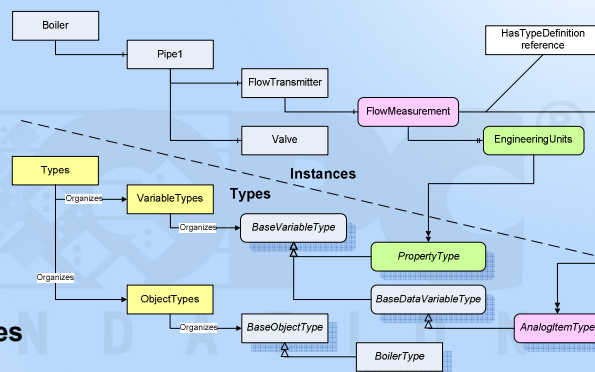


Object Node Class



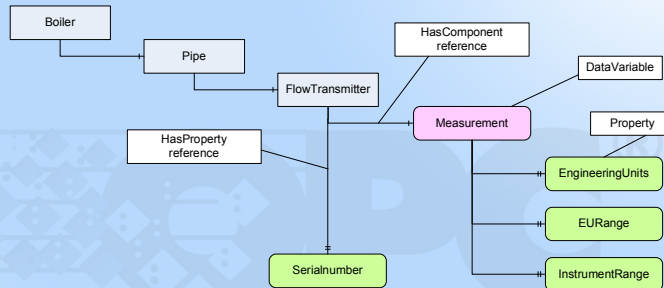
- Typical items in Address space
- Folders are used to organize the address space
- Root folder provides the main entry point into the address space
- The Boiler object and its contained objects represent the hardware system components

Variable Type Node Class



- ▶ VariableTypes folder organizes variable types
- ▶ VariableTypes can contain variables and properties
- ▶ A property is just a variable that can not contain additional variables (leaf)

Variable Node Class



► Variables

- Are components of objects representing the data of objects
- Can be complex and can have Properties
- Can be typed (VariableType)

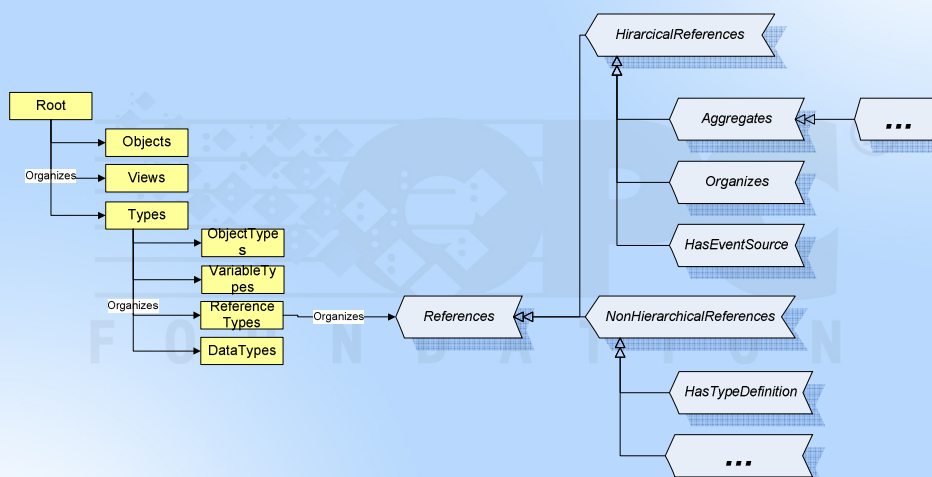
► Properties are providing metadata for nodes

- Properties are always the leaf of a hierarchy

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ReferenceType Node Class

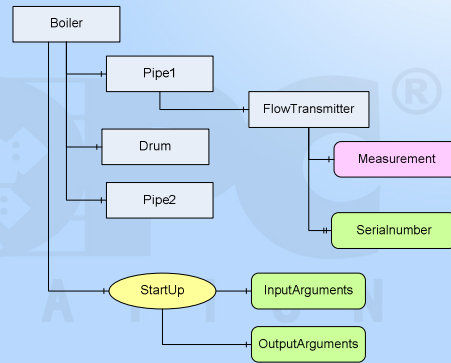


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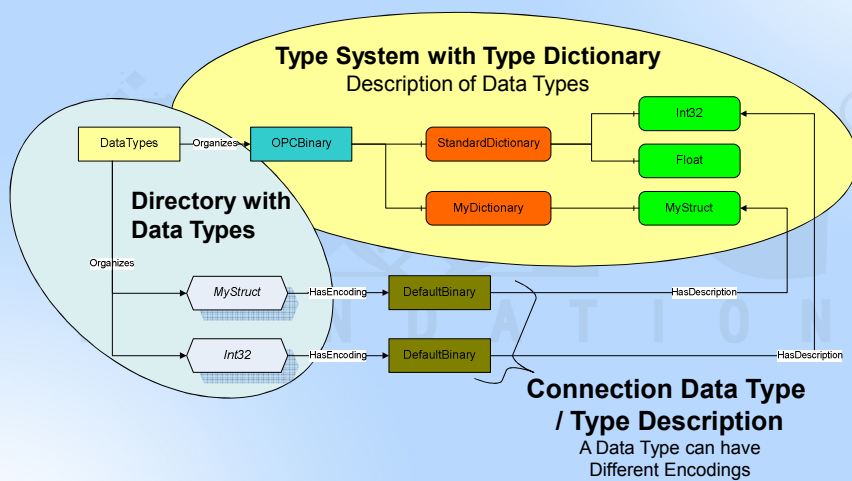
Method Node Class

- ▶ **Methods are components of objects**
- ▶ Provide interface to execute an action
- ▶ **Arguments of Methods are described with properties of the Method**
- ▶ **Arguments of Methods can be complex**



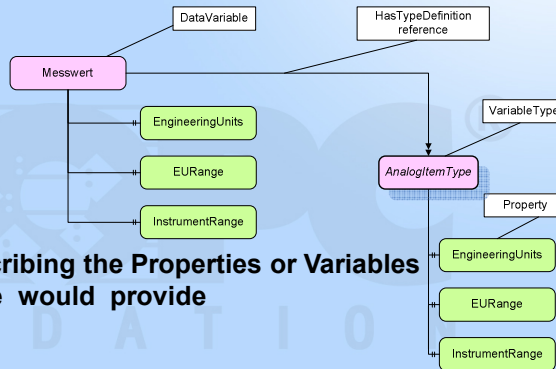
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DataType NodeClass and Complex Data



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VariableType vs. DataType



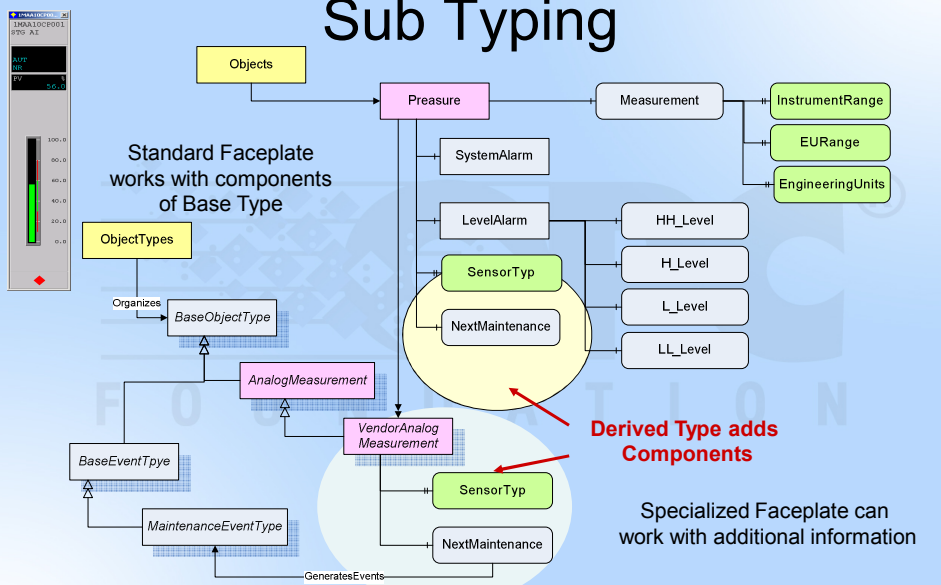
VariableType

- Defines a structure describing the Properties or Variables an instance of a Variable would provide

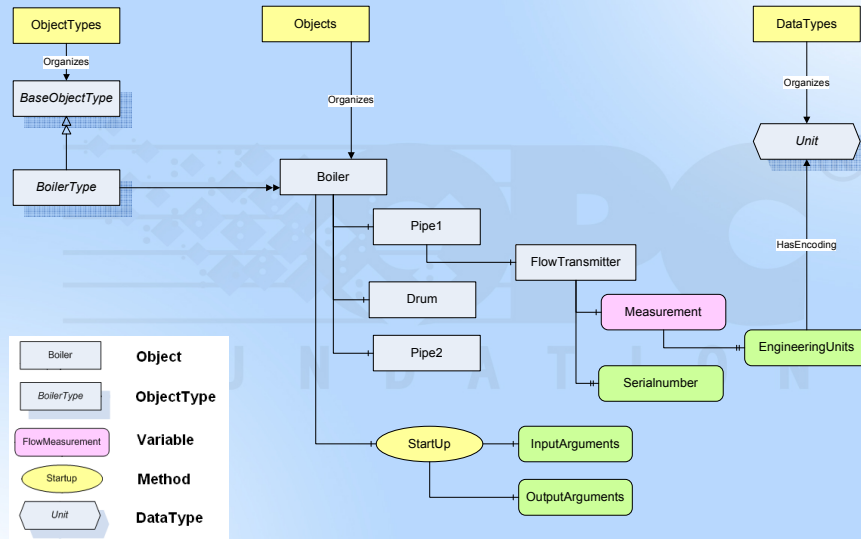
DataType

- Defines the Data Type of the Value Attribute of a Variable
- Can be scalar (e.g. Float) or complex type (e.g. Structure)
- Data Type ID of a Variable is the Nodeld of the DataType Nodes

Sub Typing



UA Node Example



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Type Definitions: Summary

- General to all Types in UA
 - Types are represented in the Address Space
 - Type Hierarchies
- Object Types
 - Instance Declarations with Modeling Rules
 - Event Types
- Variable Types
 - Data Variables (Typed)
 - Properties (identified by BrowseName)
- Reference Types
 - Hierarchical References – Nonhierarchical References
 - Used in Browsing and Querying as Filter
- Data Types
 - Important for Value Attribute of Variable (all other Attributes have fixed, build-in Data Types)
 - Extensible -> complex data build-in UA

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Questions?

- **Paul Hunkar**
- Paul.Hunkar@DSInteroperability.com

