PCA, MIMOSA, Fiatech Forum – Americas 2013

Geometry SIG Update

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(Chair: Geometry SIG)

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Agenda

- Current SIG Members
- Background and requirements for the SIG
- Relationship to other SIGs and other community
- Deliverables, Status and Results

Current SIG Members

- Aveva, Bechtel, Bentley, Noumenon, TechInvestLab.ru, Tecgraf/PUC-Rio

- Participants:
  - Andrew Prosser – Aveva, UK
  - Darius Kanga – Bechtel, USA
  - Keith Willshaw – Bentley, UK
  - Manoj Dharwadkar – Bentley, USA
  - Adrian Laud – Noumenon, UK
  - Victor Agroskin – TechInvestLab.ru, Russia
  - Gabriel Lopes – TecGraf/PUC-Rio, Brazil

Background and requirements for the SIG

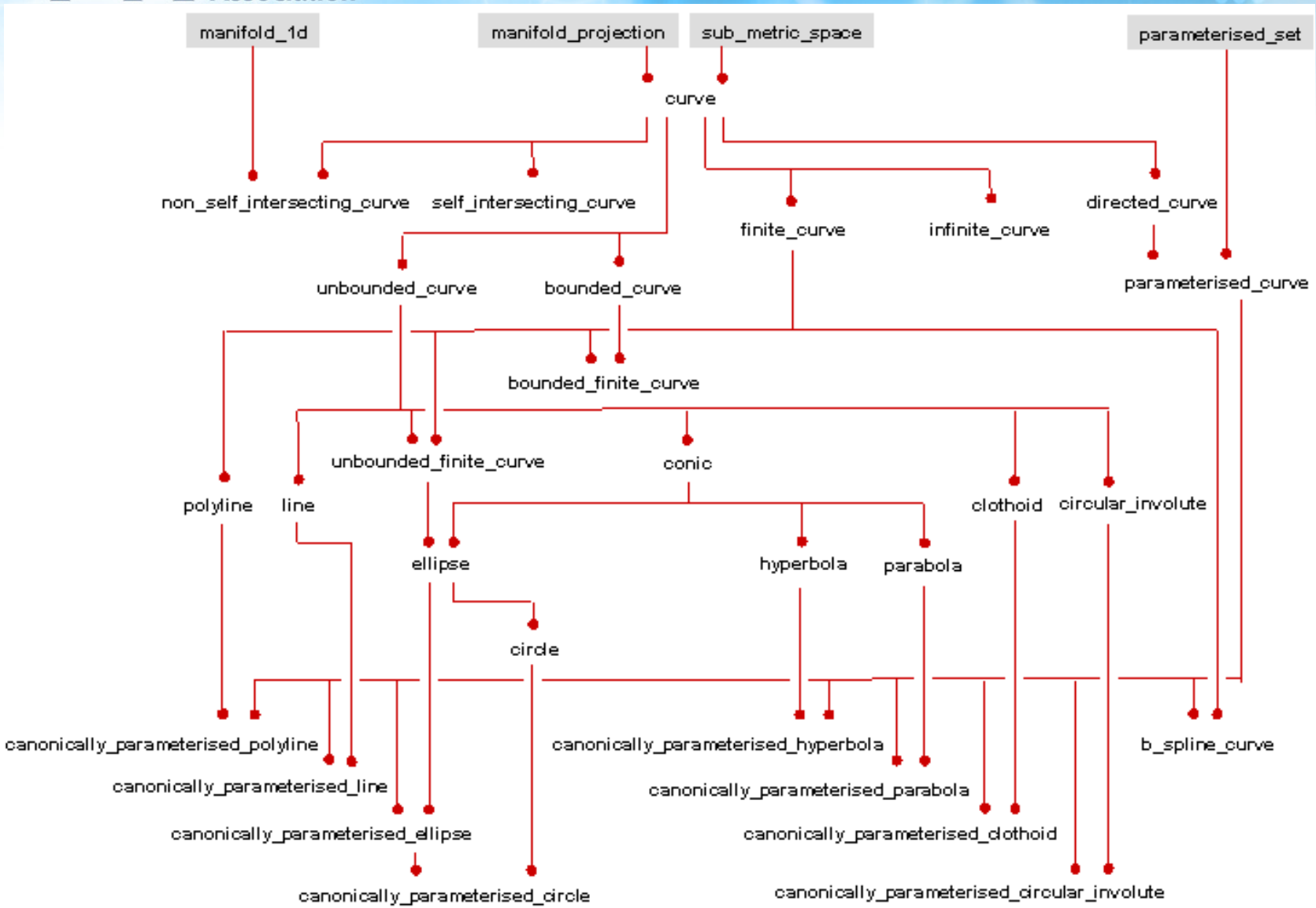
- Collaboration of

Background and requirements for the SIG

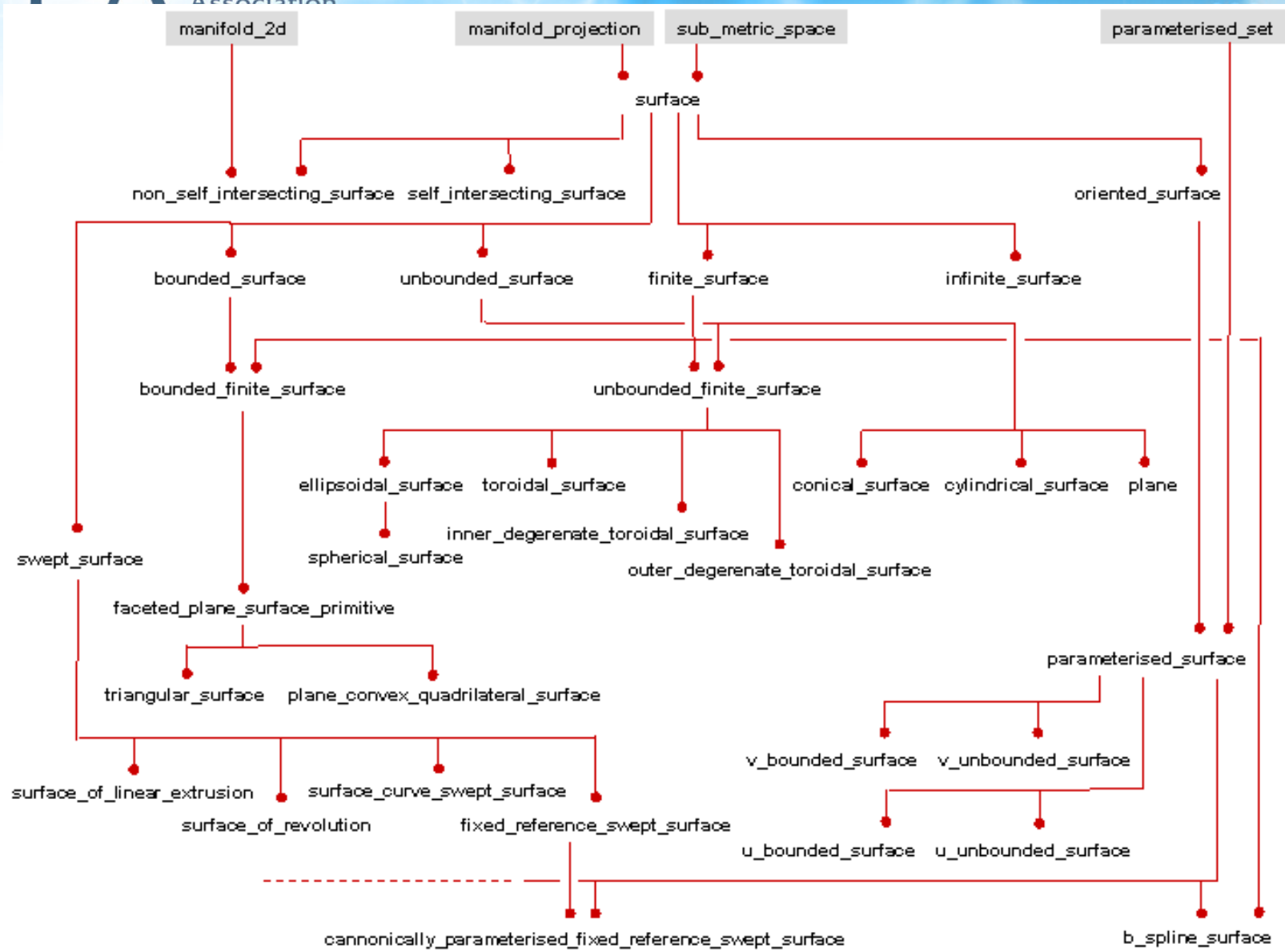
- Geometry Requirements
  - P&ID Documents and 3D Model representation for Process Plants
  - Integration with BIM (IFCs) and Facility Management
  - Integration with GIS
  - Supply Chain and Design to Construction
- Challenges
  - Geometry Reference Data available as Part3 (derived from STEP Part 42) but not represented as Templates

Background and requirements for the SIG

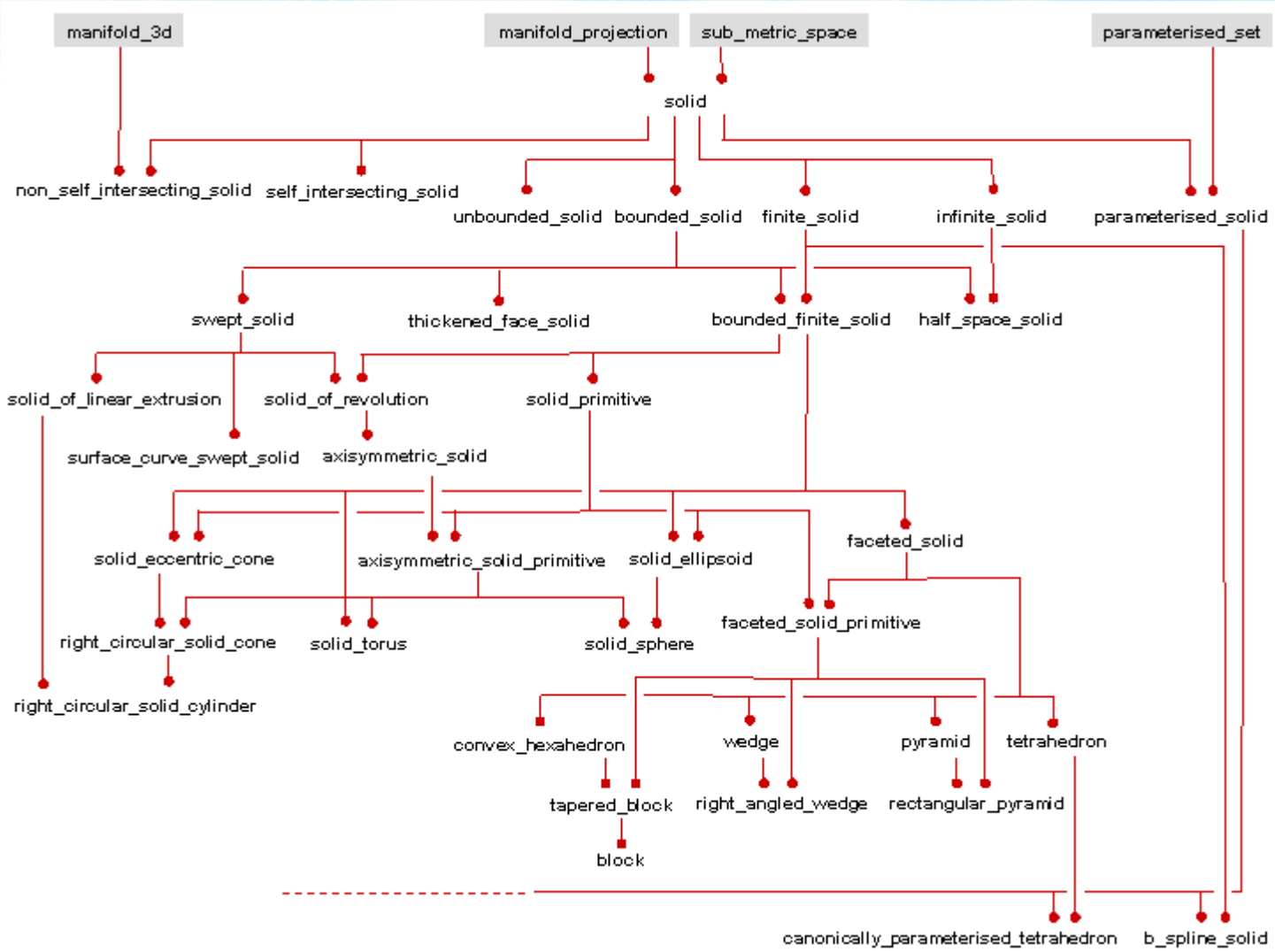
- Goal: Representing ISO 15926 Part 3 Geometry Reference Data using Part 7 Template Methodology and advancing the usage of Geometry Reference Data



Principal subclasses of curve



Principal subclasses of surface



Principal subclasses of solid

Relationship to other SIGs/Communities

- ISO 15926 P&ID/3D Information Models and Proteus Schema Mappings (Fiatech Approved Project)
  - Close collaboration with Geometry SIG
  - Informally work underway for P&ID Information Model
- Joint MIMOSA/PCA Operations and Maintenance (O&M) SIG
  - Providing Geometry and P&ID Information model requirements from the OGI Pilot

Relationship to other SIGs/Communities

- PCA Modeling Methods and Technology (MMT) SIG
  - MMT providing guidance in resolving modeling issues
- ISO 15926 Information Patterns (IIP) Project
  - Collaborating with Geometry SIG
- DECHEMA DEXPI (Data EXchange Process Industry) Working group focusing on P&ID exchange
  - Providing requirements for P&ID Information Model including Geometry, Topology, and Object Information

ISO 15926 P&ID/3D Information Models and Proteus Schema Mapping Project

- Current Team Members – Adrian Laud (Lead), Keith Willshaw, Andrew Prosser, Manoj Dharwadkar
- Document P&ID and 3D Models in terms of Classes and Templates
- Mapping the Proteus Schema to the ISO 15926 P&ID/3D Information Model

Deliverables, Status, and Results

Geometry SIG deliverables are:

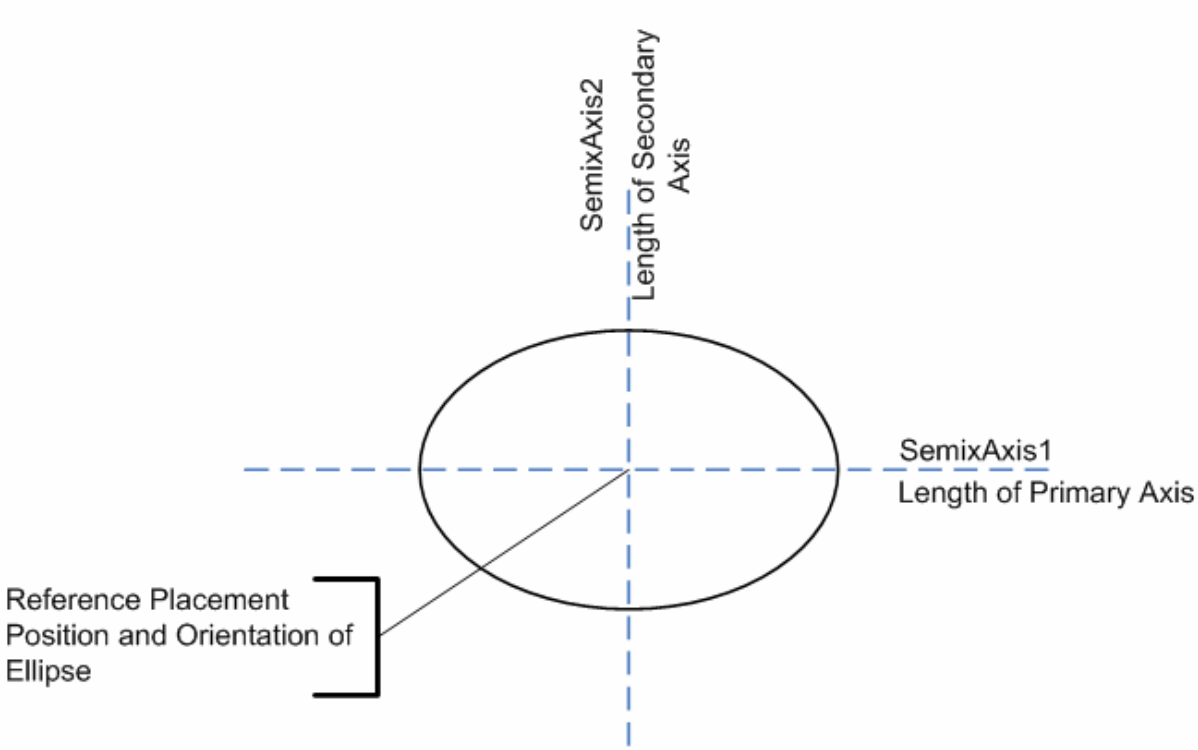
- Geometry Template Signatures in Spreadsheet format
- Documentation of Geometry Reference Data to assist implementers and users
- Example usages of Geometry Reference Data
- Geometry Templates and Classes as Part 8 OWL representation
- Geometry Reference Data hosted in a PCA/FIATECH Sandbox exposed through a SPARQL endpoint

Deliverables, Status, and Results

Status and Results:

- 2D Geometry Status
  - Released draft documents for review providing the details of the ISO 15926 Part 7 templates
  - Released Geometry Template Signatures in Spreadsheet format
  - https://www.posccaesar.org/wiki/SigGeometry
- Very valuable input provided by Victor Agroskin and has helped create initial Part 8 OWL Template Representation

Geometry Template Example: Ellipse



Geometry Template Example: Ellipse

- The Reference Placement is modelled as ISO 15926 Part 3 Class Axis2 Placement using the following template

Property Name	Data type	Example	Required	Notes
ReferencePlacement	URI		Y	References an Axis2Placement
SemiAxis1	metric_space_length	20	Y	Scale defined by the coordinate system of the reference placement
SemiAxis2	metric_space_length	35	Y	Scale defined by the coordinate system of the reference placement

Geometry Template Example: Reference Placement

Role No	Role Name	Role Type	Remarks
1	hasObject	Axis2Placement	uuid of Axis2Placement
2	hasReferencePoint	MetricSpacePoint	ref of MetricSpacePoint
3	hasReferenceDirection	GeometryDirection	ref of GeometryDirection
4	hasXAxisReferenceDirection	GeometryDirection	ref of GeometryDirection

Geometry Template Example: Reference Direction

Role No	Role Name	Role Type	Remarks
1	hasObject	GeometryDirection	uuid of GeometryDirection
2	hasCoordinateSystem	CartesianCoordinateSystem	ref of Coordinate System
3	valXCoordinate	Real	X Coordinate
4	valYCoordinate	Real	Y Coordinate
5	valZCoordinate	Real	Z Coordinate

Geometry Template Example: Cartesian Coordinate System

Role No	Role Name	Role Type	Remarks
1	hasObject	CoordinateSystem	uuid of Coordinate System
2	valSpaceDimensionality	Integer	2 for P&ID
3	hasLengthScale	LengthScaleClass	from RDL
4	hasAngleScale	AngleScaleClass	from RDL

ToDo - Geometry Relationship Templates

- Geometry primitives will be stored as an unsorted list
- New template yet to be finalized

Role No	Role Name	Role Type	Remarks
1	hasObject	PossibleIndividual	uuid of Symbol
2	hasGeometry	AbstractObject	uuid of GeometryList
3	hasArrangementType	ClassOfArrangementOfIndividual	New RDL entry such as SymbolHasGeometry needed

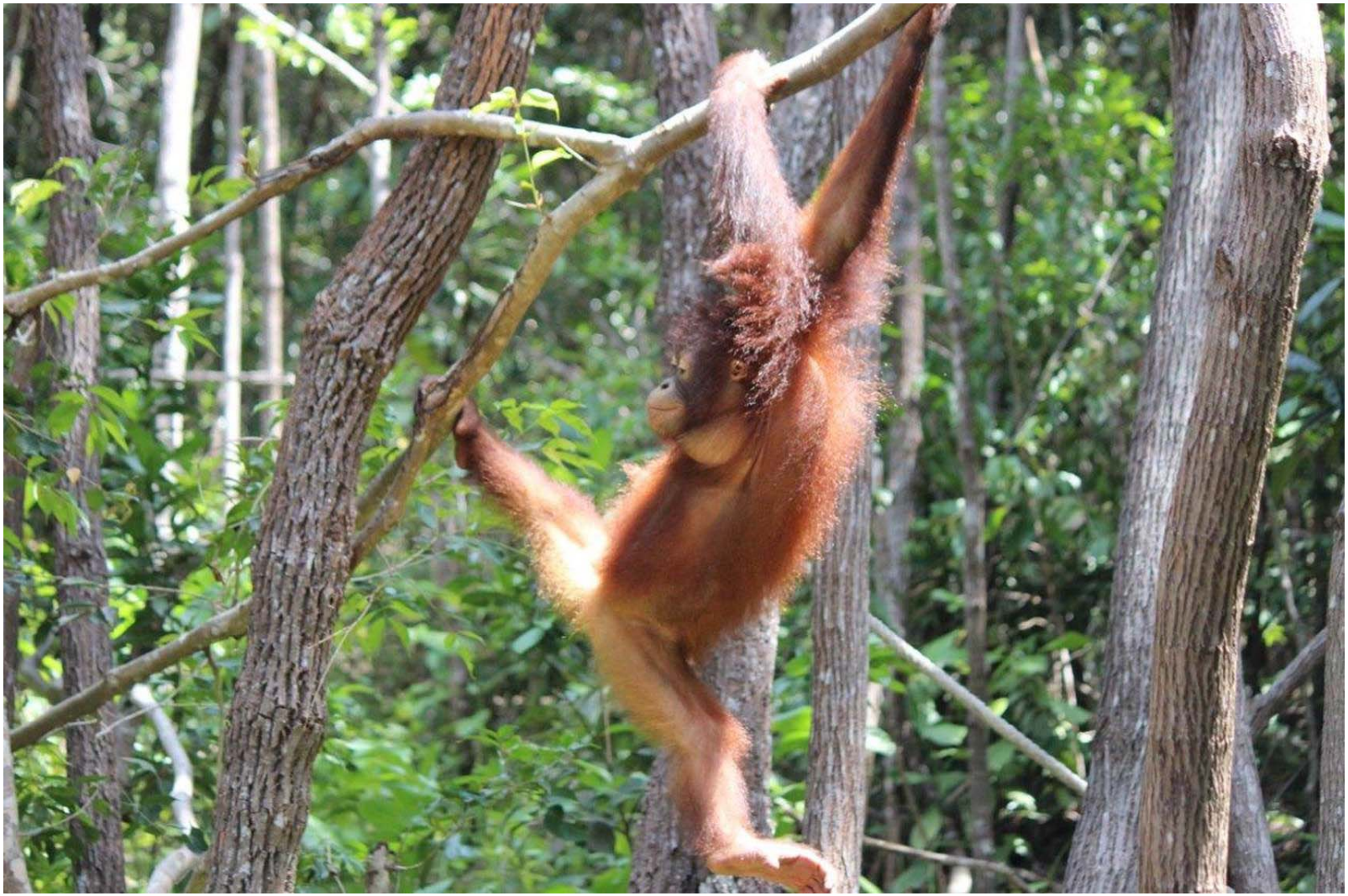
ToDo - Geometry Presentation Templates

- Properties that define how they look in the document
- New templates yet to be finalized to define these properties including Layer, Color, Line Style

ISO 15926 P&ID Information Model : Current Status

- Draft Working document created
- Documenting P&ID Information Model in terms of Classes and Templates
- Initial mappings between Proteus Schema and Part 7 Templates created

We're getting there...



Questions?

Thank You!!

- **Contact Info**
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