Optimization Services Framework and OSxL Protocols

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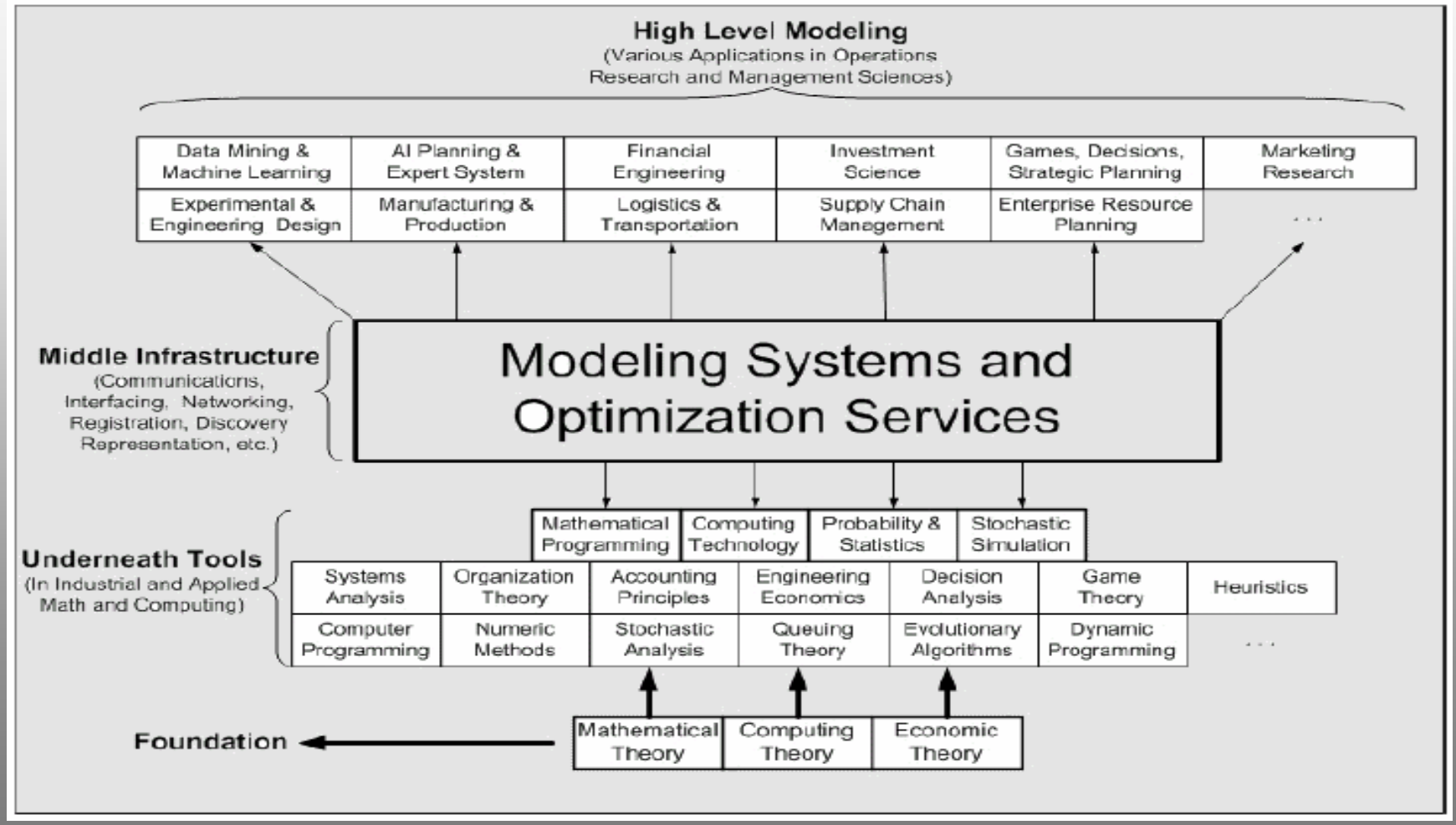
The Positioning of Optimization Services Framework in OR/MS



What is “Optimization Services” (OS)?

- A proper noun. It’s intended as a standard, and it’s all new
- A framework, NOT a system (cf. constitution, NOT government/Court System)
- Only that the specifications are written in XML (NOT English)
- Intended for next generation modeling systems as Internet resources.
- Distributed Environment (cf. Local Environment is a Special Case, e.g. Monitor and CPU)
- Decentralized Environment (Registry Vs. Server)
- A Universal Idea (System Decomposition, Interfacing, Representation)
- General Principle (4S)
  - Standard (oasis-open.org: discussion list -> technical committee -> draft -> Standard)
  - Simple (not the framework, but the framework components. Libraries provided)
  - Scalable (general OSxL specification design, where ‘x’ stands for any other 25 letters)
  - Smooth (Service Oriented Architecture or SOA, cf. Utility Services)

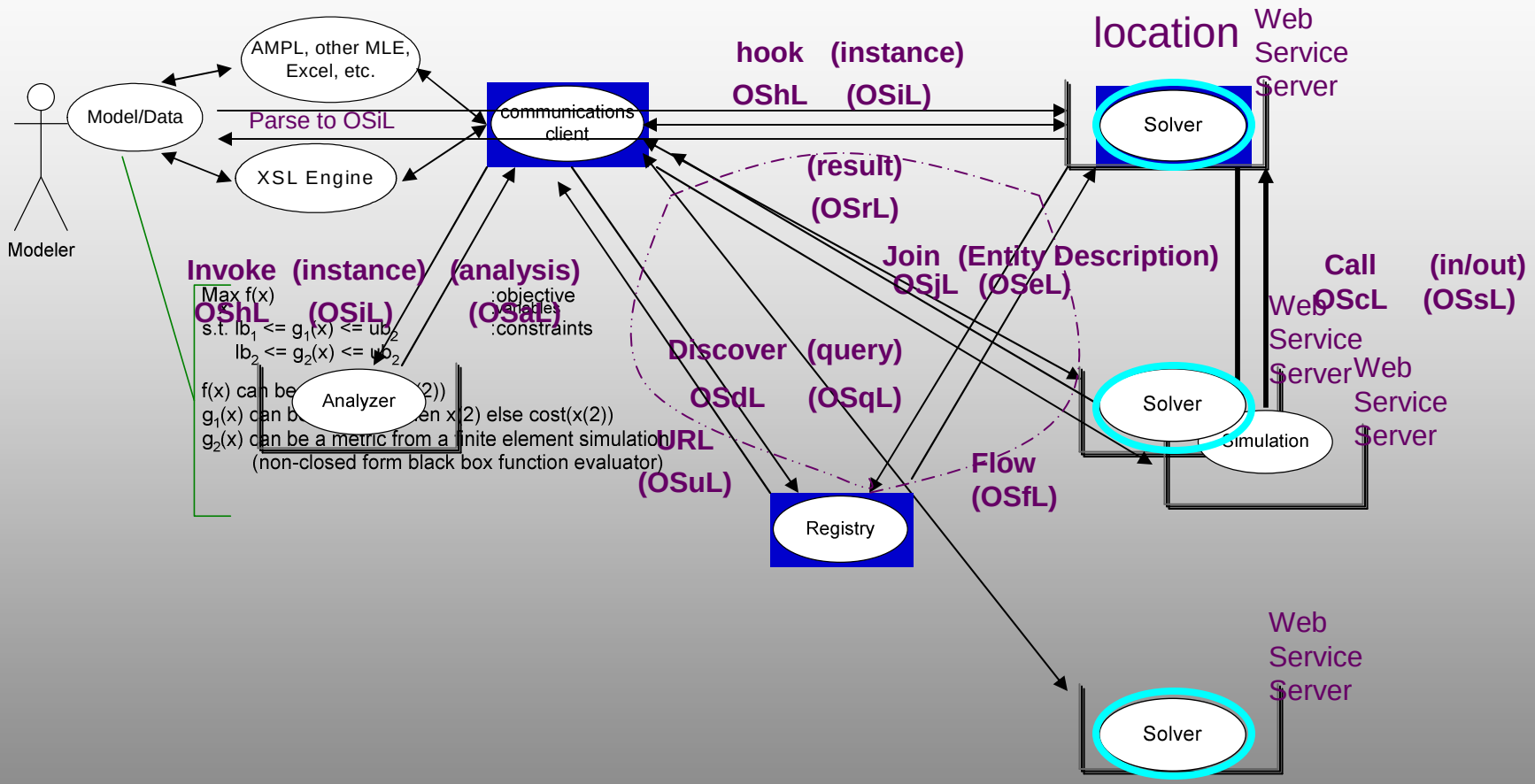
System Components

1. Models and Instances
2. Modeling Languages Environments, Transformation Engine, etc.
3. Optimization Servers/Registries
4. Clients and Interfaces
5. Preprocessors/Analyzers
6. Optimization Solvers
7. Function Evaluators and Simulation Engines
8. Others? (Benchmark Problem Services etc.)

OS Framework and OSxL Specification

XML-based standard

communication (representation)



[Standard, Simple, Scalable] => Smooth

- **The General and Universal Framework for Optimization in Local and Distributed Environment.**
- **Combining Optimization with Modern Computing Technologies.**
- **A Next Generation Modeling System as An Internet Resource.**
- **Standardization of Optimization Representation, Communications, Registration, and Discovery**
- **Using Optimization Computing Tools Just Like Daily Utility Services.**

Chapter 12. OS Representation

1. OSlL (linear) – in honor of the original LP-FML
2. OSgL (general) – general schema
3. OSnL (nonlinear nodes) – nonlinear node definitions
4. OSiL (instance) – optimization instance
5. OSrL (result) – optimization result
6. OSoL (option) – solver option
7. OSaL (analysis) – analyzer metadata
8. OSsL (simulation) – simulation engine input and output
9. OStL (template) – template holding other representations
10. OSmL (modeling) – XML query based modeling language

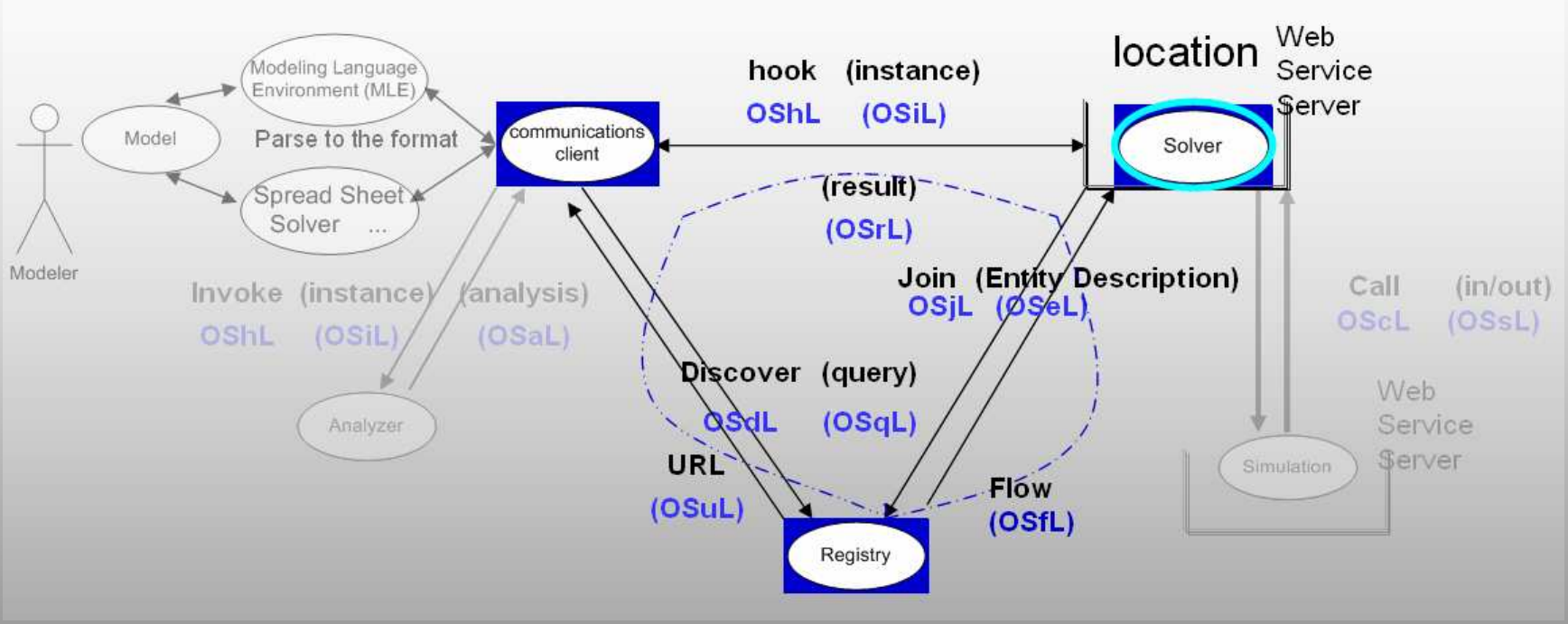
Chapter 13. OS Communication

1. OScL (call) – call simulation engines
2. OShL (hook) – hook up solvers
3. OSdL (discover) – discover optimization services
4. OSjL (join) – join OS registries
5. OSfL (flow) – orchestrate flow of OS invocations
6. OSvL (validate) – validate OS representations

Chapter 14. OS Registration and Discovery

1. OSeL (entity) – endpoint OS component static description
2. OSpL (process) – OS component runtime process description
3. OSzL (zero) – dummy instance for sending signals
4. OSqL (query) – query language for OS components
5. OSuL (URL) – query result containing OS component URL addresses
6. OSyL (yellow pages) – organization of registry information
7. OSbL (benchmarking) – benchmark information of OS solvers
8. OSkL (knowledge) – knowledge template holding other component information
9. OSwL (web page) –XSLT for standard web publication of OS components

OS Framework and
XML-based standard OSxL Specification
communication (representation)



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