

NCEP Unified Workflow

(working name)

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May 15, 2017

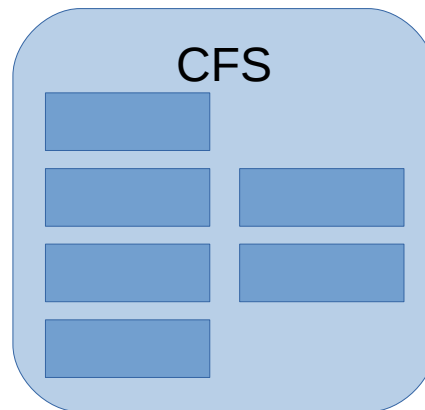
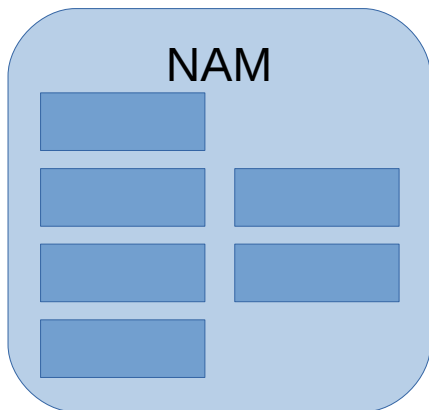
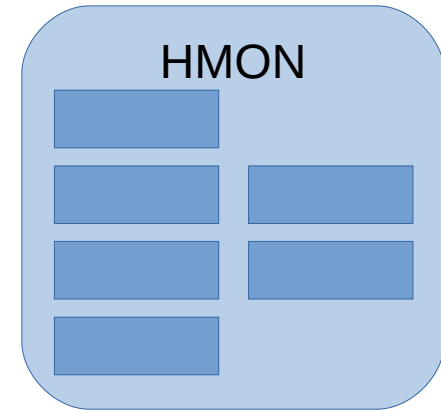
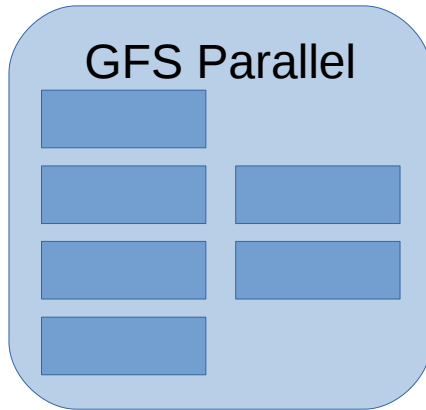
NCEP Unified Workflow Project Outline

- The Problem
- System Design
- Simplifications
- Design Plan

The Problem

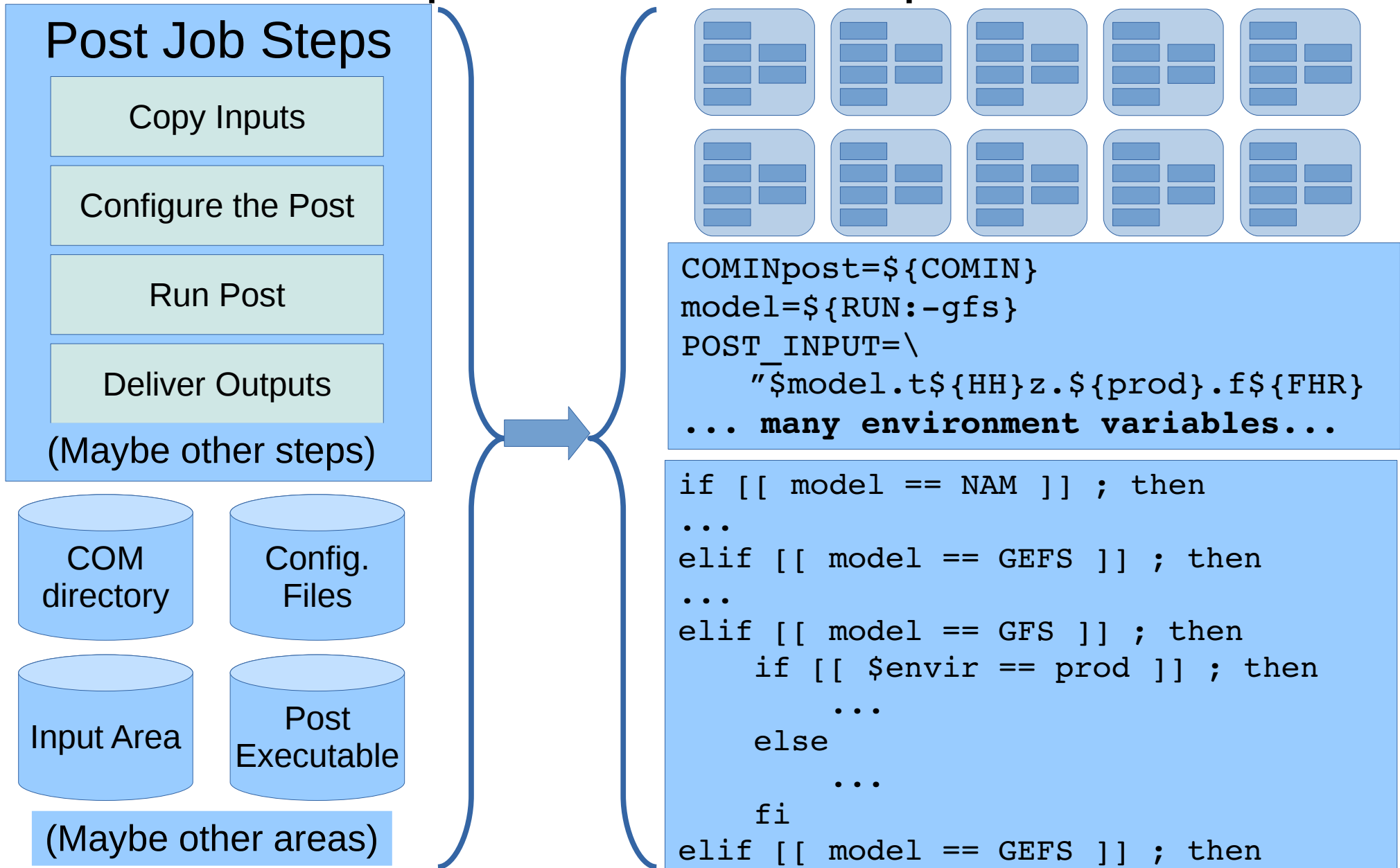
The Problem

Many Workflows



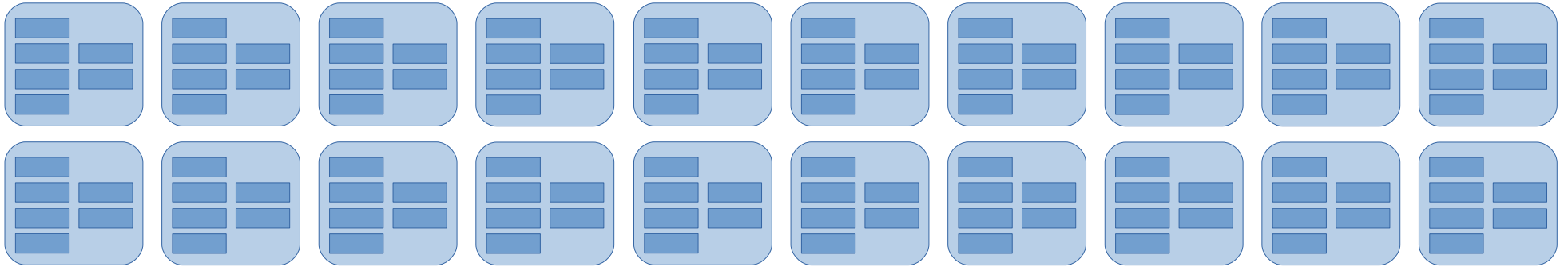
The Problem

Example Reason for Duplication



The Problem

Consequences



- Workflows must be developed and maintained
 - Duplication of effort.
 - EMC spend most of its human resources scripting
 - Training cost: new employees must learn many legacy systems.
- Lower-quality systems.
- Different systems for operations, research, regression testing

The Problem

Scientists should be doing science
not scripting.

NCEP Unified Workflow Scope

- Unified workflow system for all use cases:
 - Production
 - Parallels
 - Regression Testing
 - Research
- Users can take the subset of the system they need.
 - Researchers don't need DBNet, nor GFS faxes.
 - Production doesn't need scientific data visualization
- Initial target: FV3 GFS and GEFS
- Choose a better name.

Design

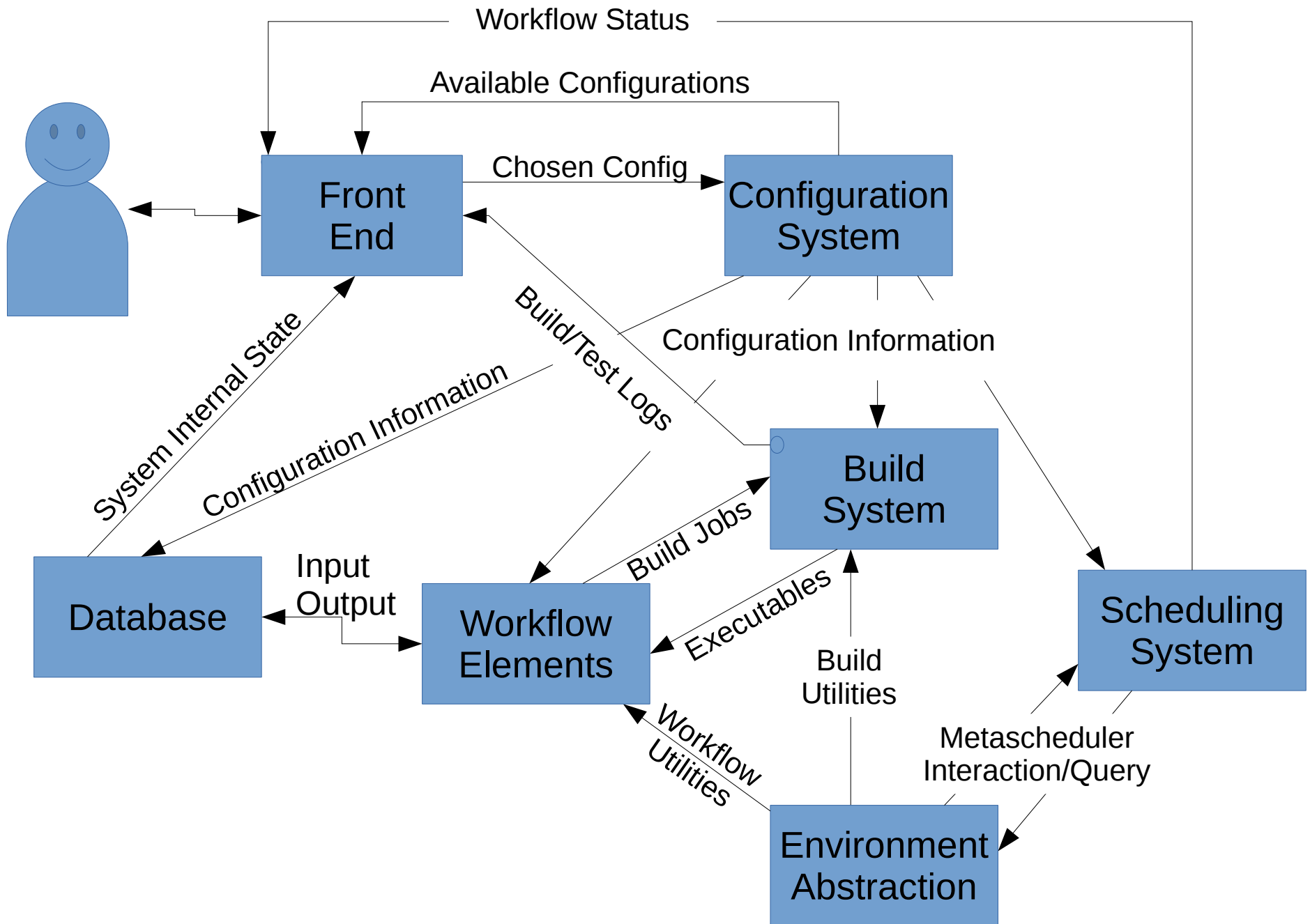
Design Principles

- Able
 - Scalability
 - Adaptability
 - Portability
 - Subsettable
 - Extensible
- End-to-end workflow
 - (All scripting levels)
 - Integrated build system
- Avoid the five evils...

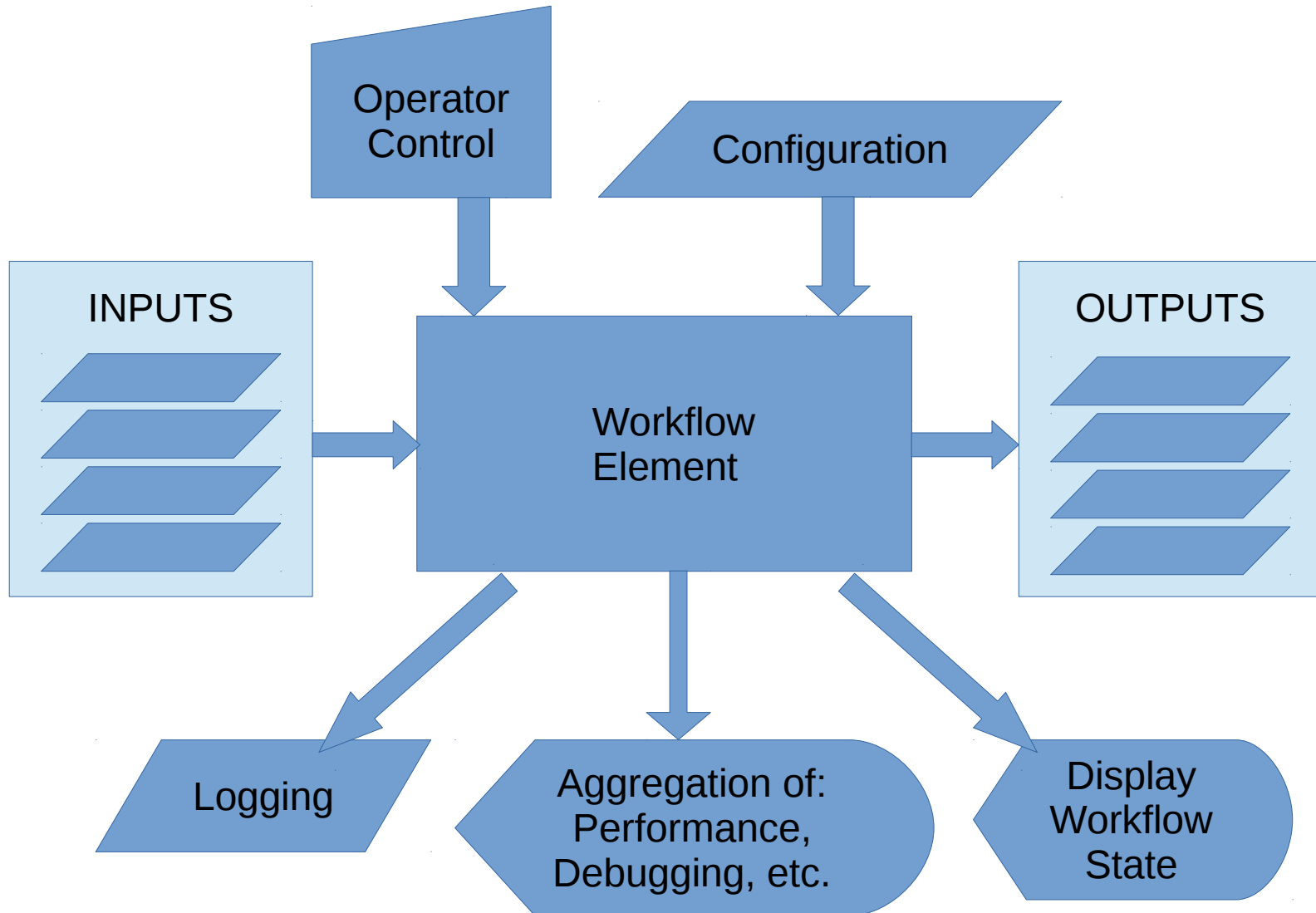
Evil Workflows

- Scripts are a necessary evil
- Small utility programs are worse
- Filesystem interaction is doubleplusungood
- Placing dataflow, porting, action, and config logic in one script is dastardly.
- Duplicate code is a pestilence

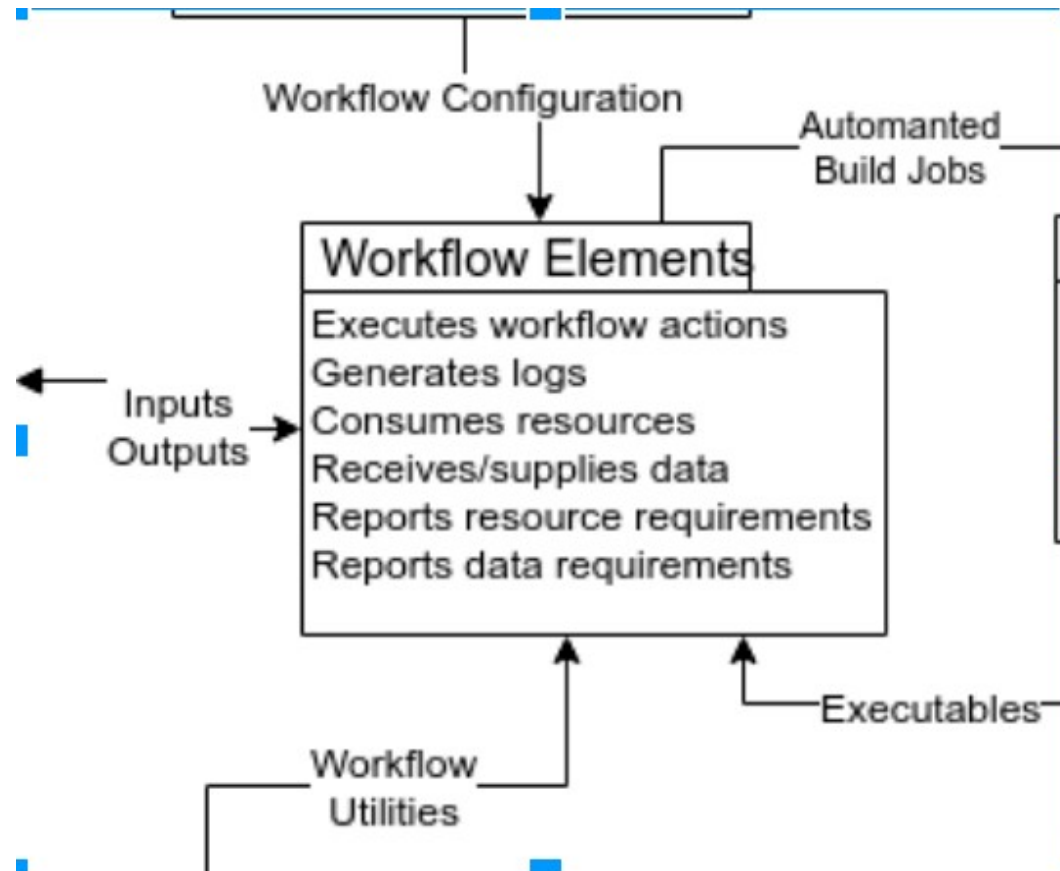
Conceptual Design



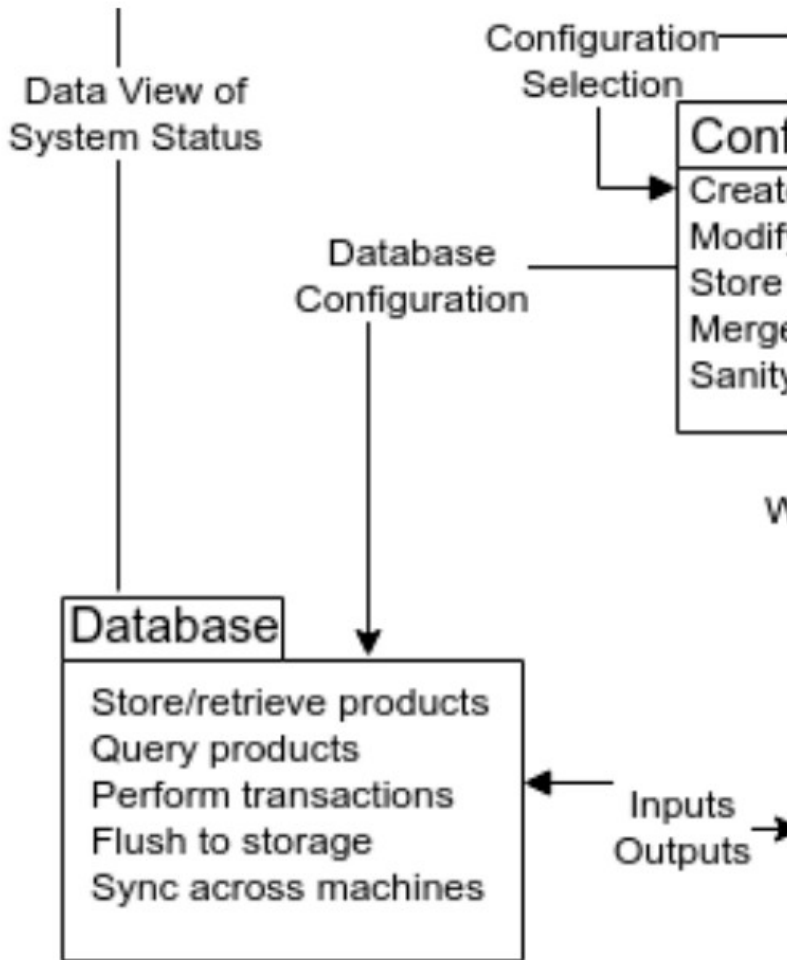
Workflow Element



Workflow Elements

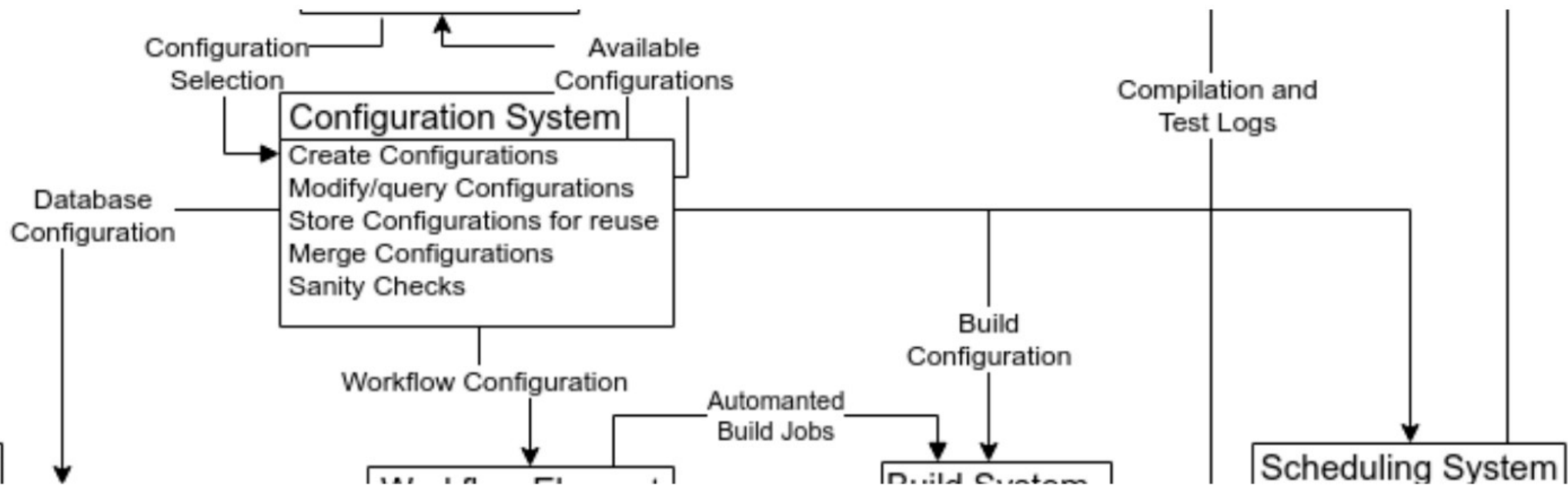


Database



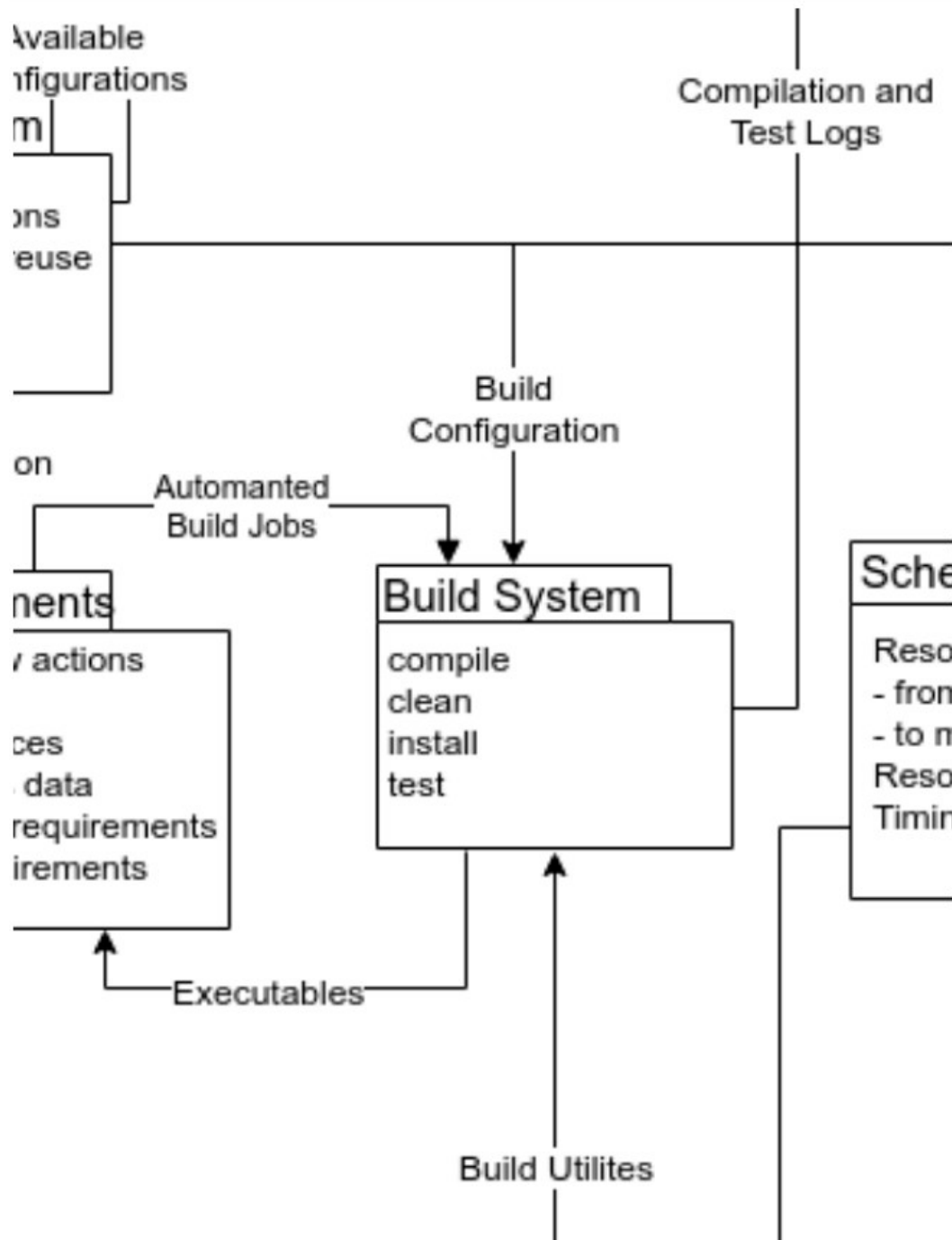
- SQL/SQLite
- Stub:
 - “copy” commands
- Connects to:
 - External dataflow
 - External monitoring

Configuration System



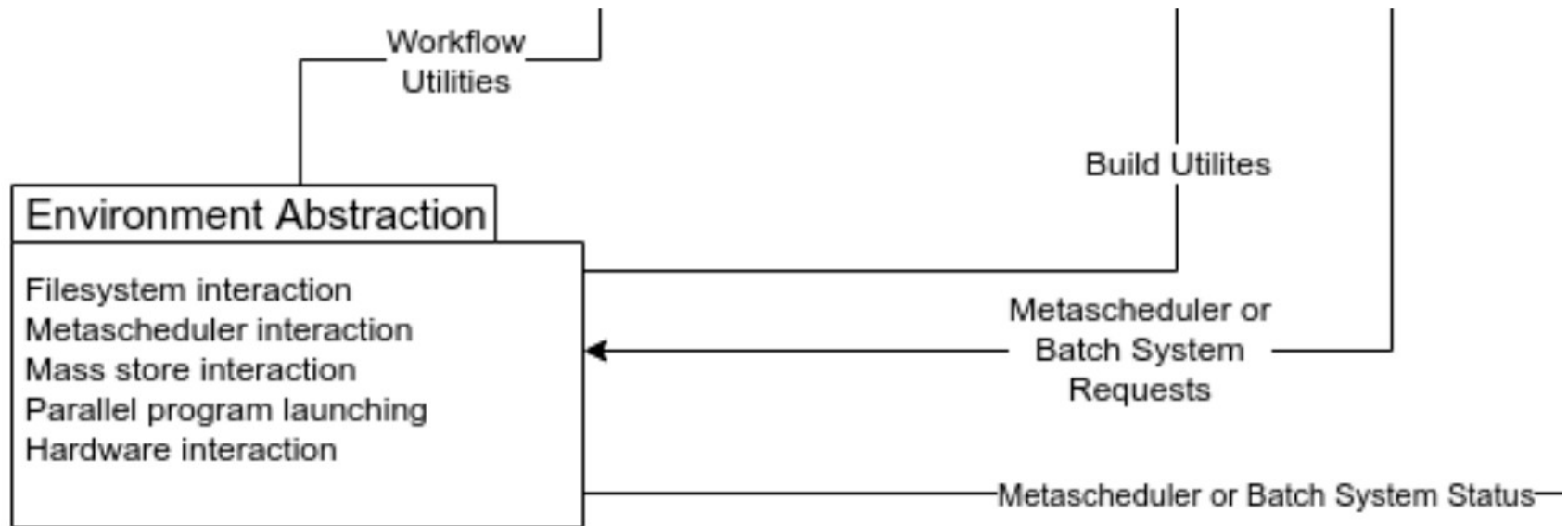
- What config language? Storage mechanism
Editing tools?
 - Many options, none stand out.
- Stub: simple function with “case” statement

Build System



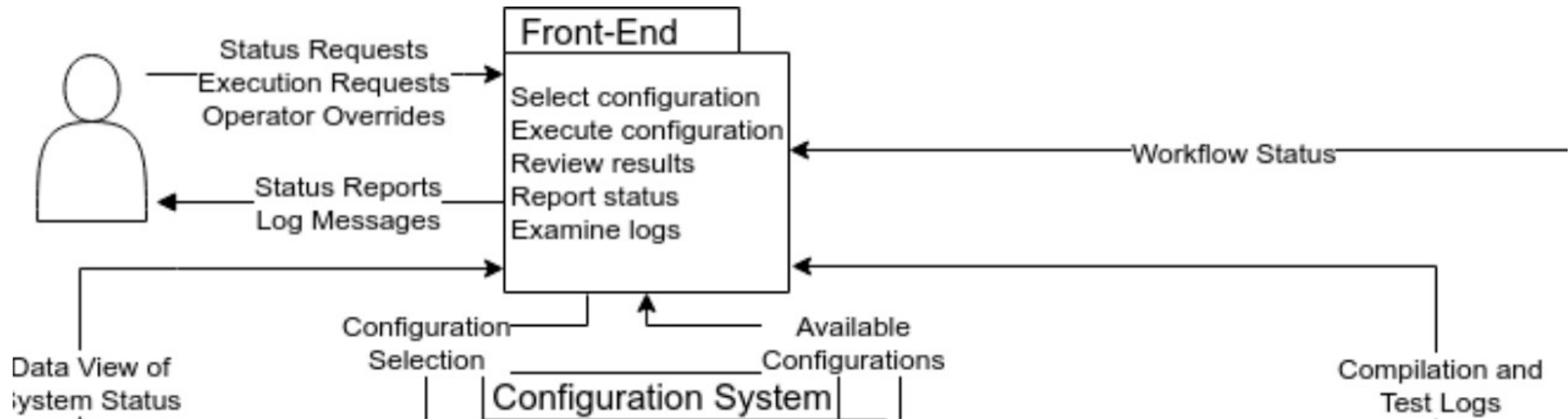
- Which method?
 - Autotools? Cmake?
 - Ad-hoc?
- Stub: manually trigger build command
 - (“cd /there/ ; make”)
- Removal pieces

Environment Abstraction

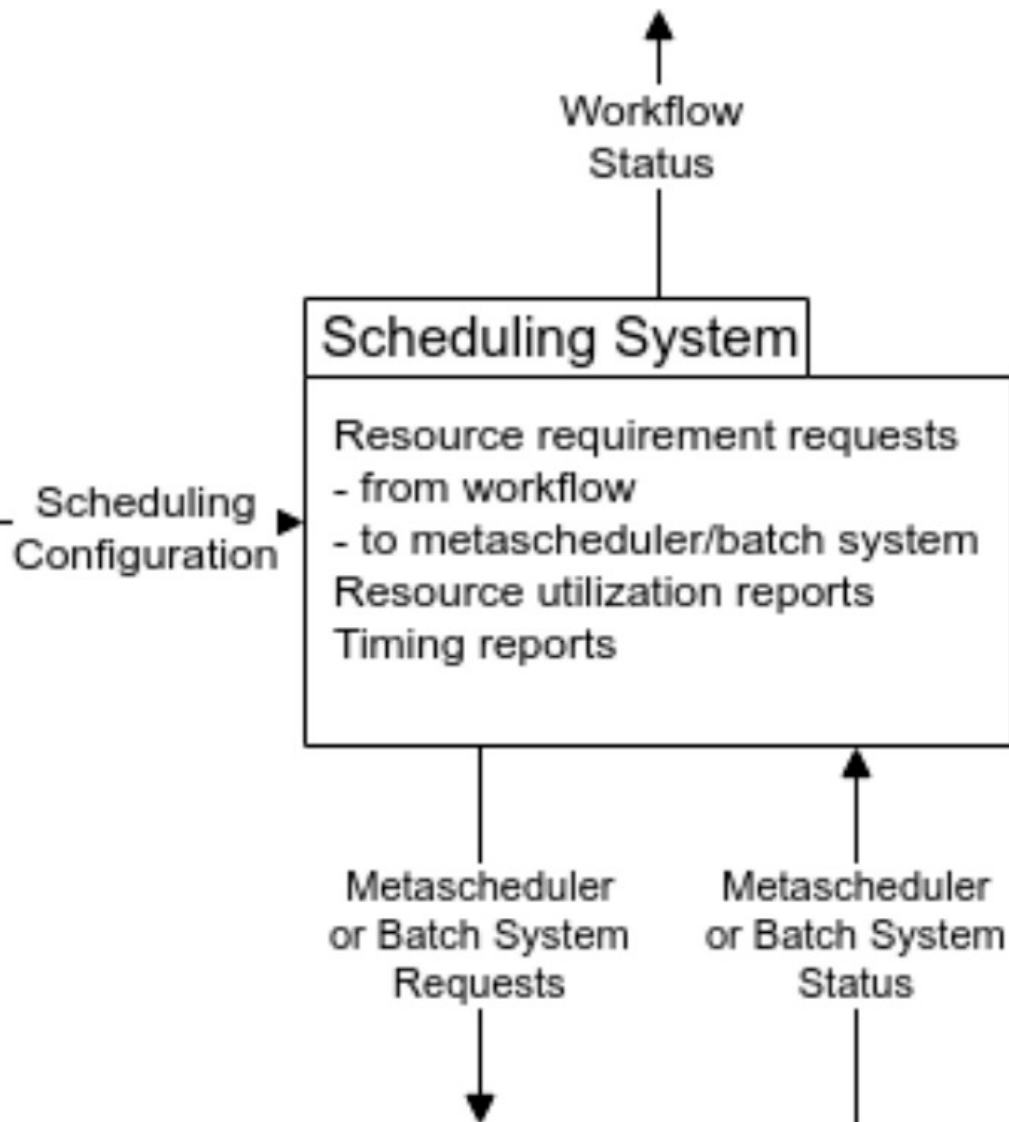


- Adapts to computing environment.
- Confine all porting to one area.

Front-End

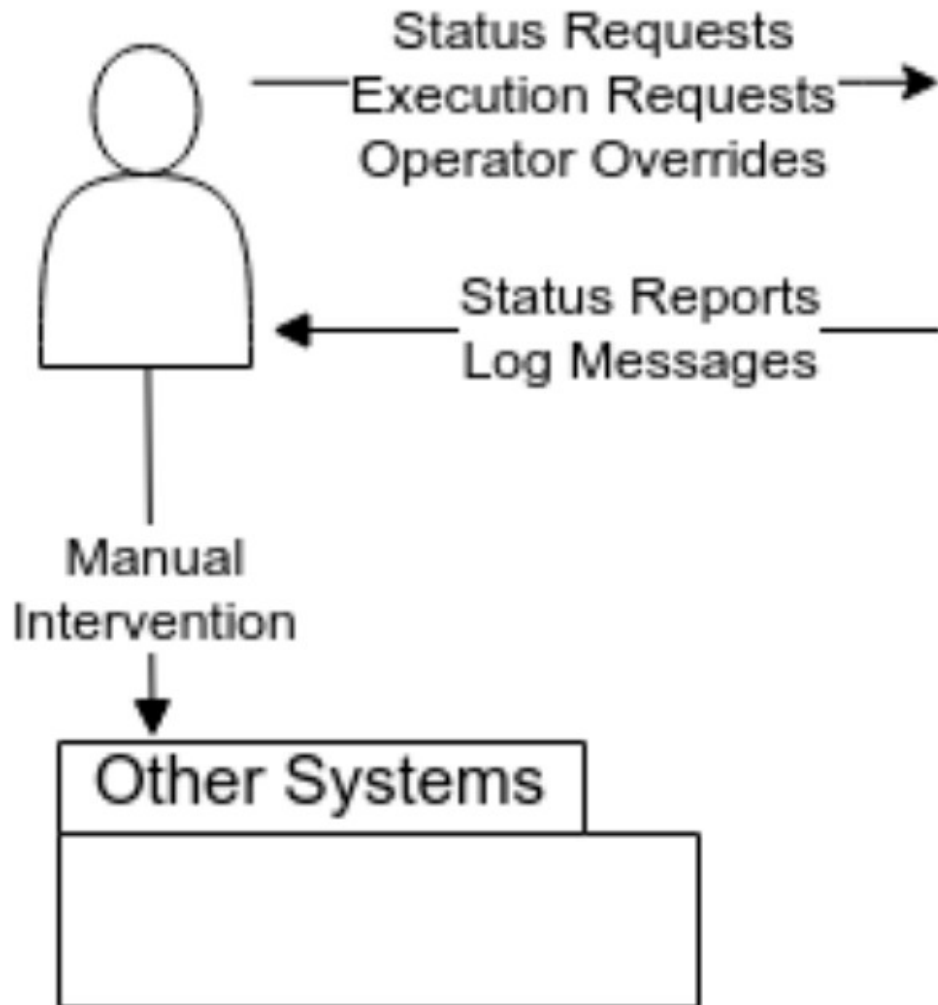


Scheduling System



- Create initial suite definition and batch cards
- Collates job and metascheduler info
 - Send to front-end
- Stub:
 - remove 2nd or both

User



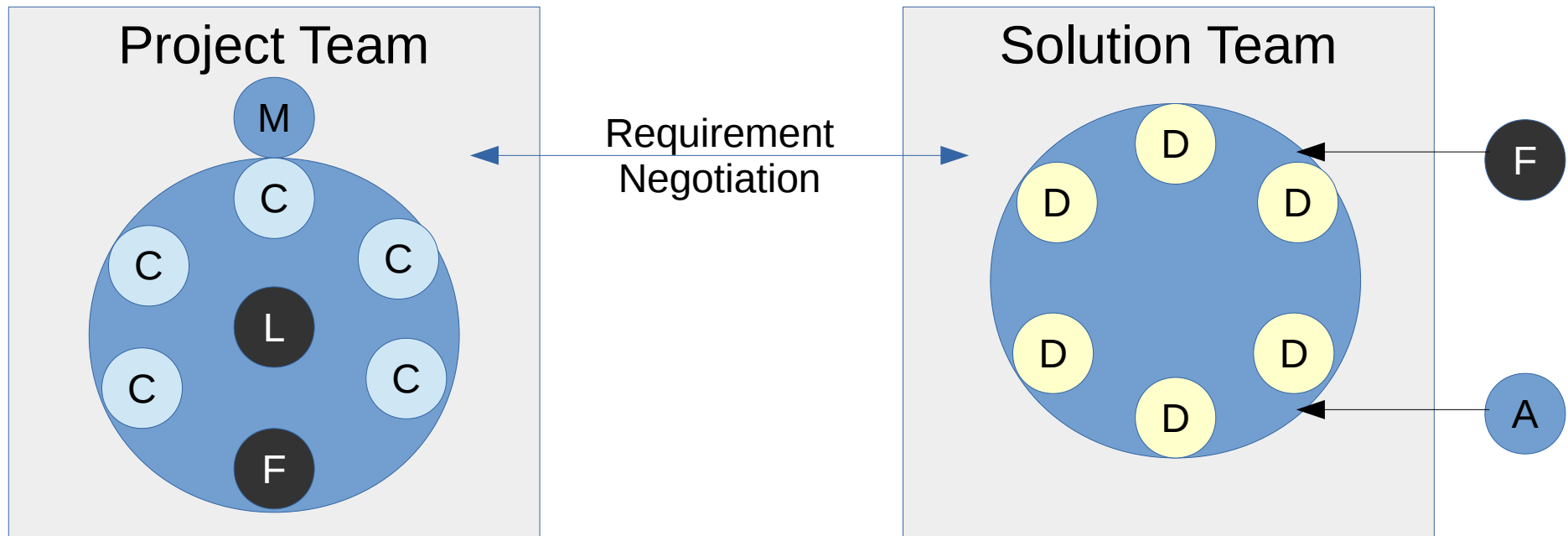
- Front-End
- Manual Overrides
- No stubs
 - Genetic engineering has yet to produce a “stub human.”

Development Process

Agile Development

- Prefer **individuals and interactions**
 - over processes and tools
- **Working software**
 - over comprehensive documentation
- **Customer collaboration**
 - over contract negotiation
- **Responding to change**
 - over following a plan

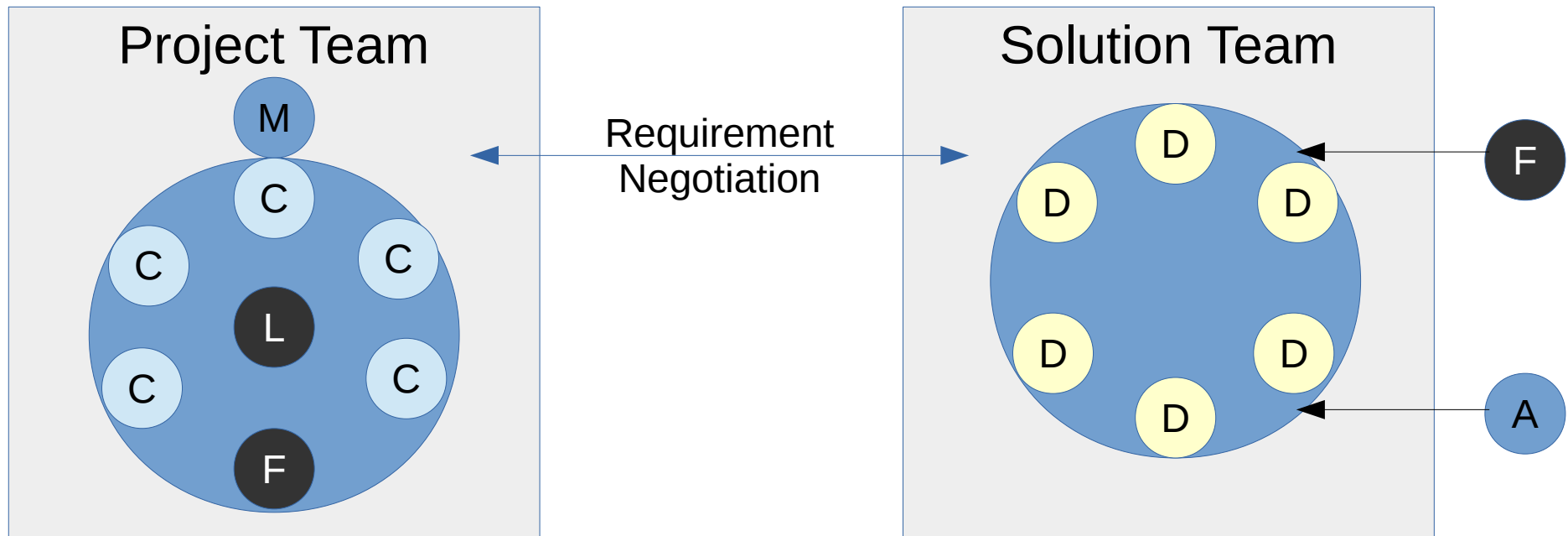
DSDM-Scrum Hybrid



- **Project Team**

- Negotiates requirements with customers
- Creates Solution Teams as needed
- Defines milestones

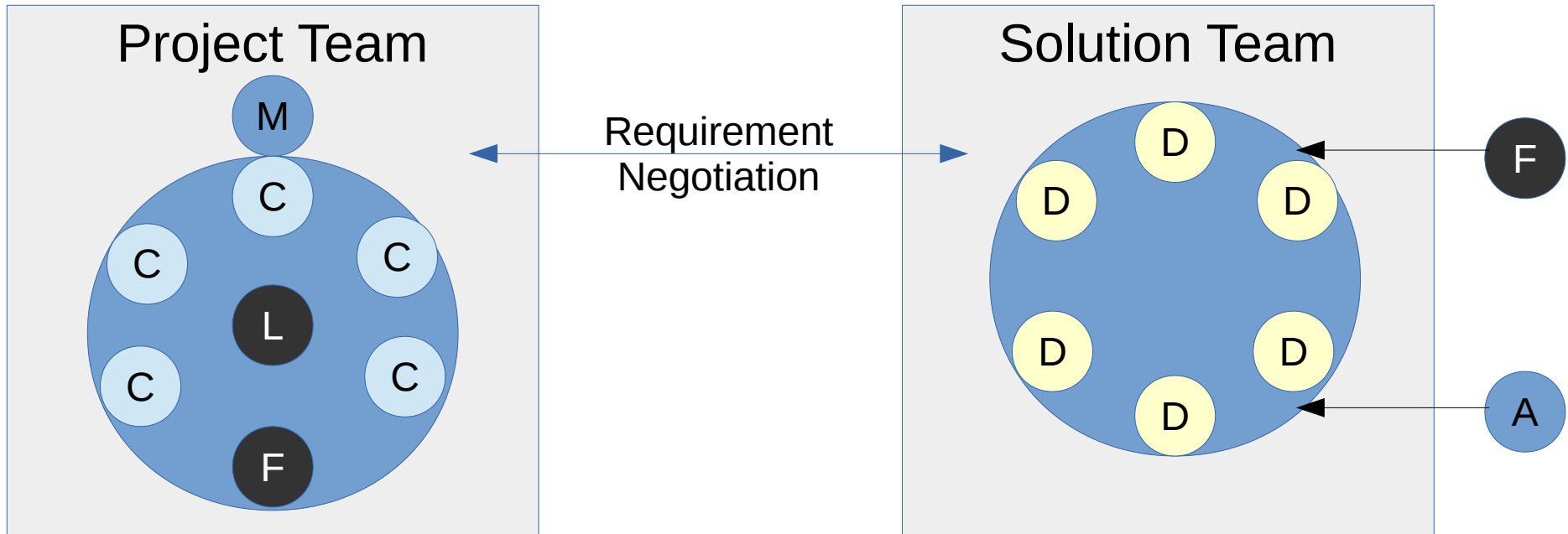
DSDM-Scrum Hybrid



- **Solution Teams**

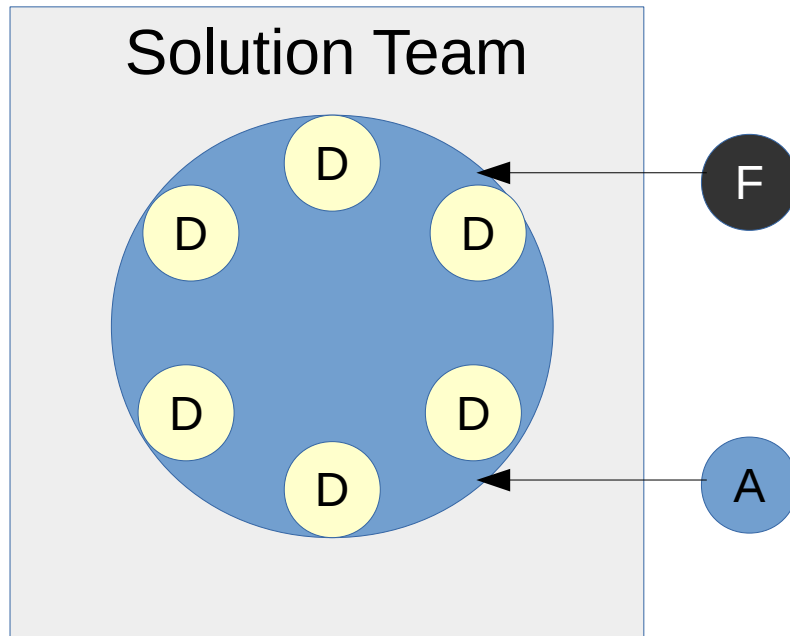
- Sets their own priorities, makes their own plans
- Negotiates requirements based on feasibility
- Management *advises* and *facilitates*
 - Does not lead.

Requirements



- “Must” - product is a failure without this
- “Should” - workarounds exist
- “Could” - would help customer/development
- “Won’t” - will not be delivered
- Requirements will be reprioritized during development

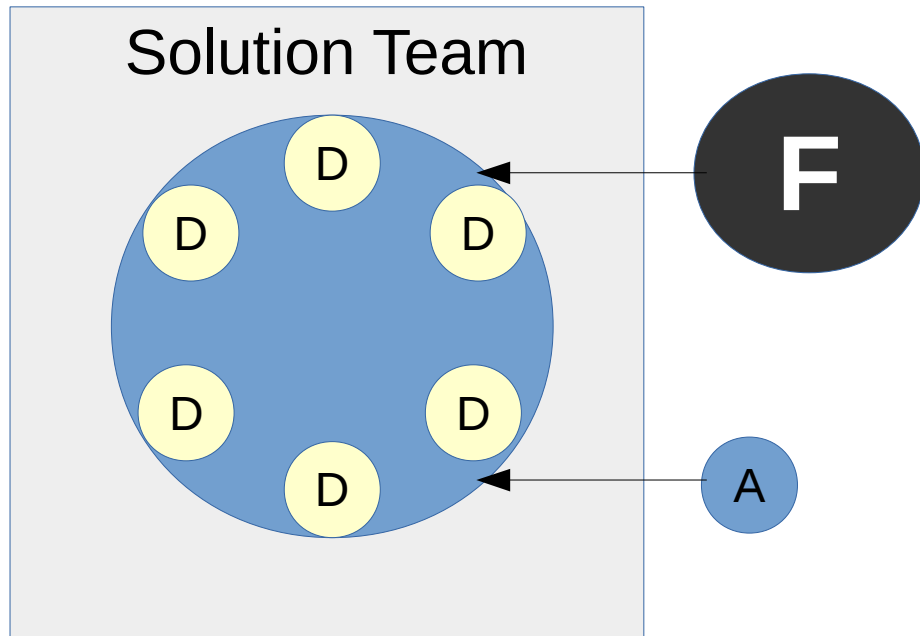
Solution Scrum Team



- Commitment
- Respect
- Focus
- Openness
- Conflict Resolution

- Close collaboration, ideally in person
- Daily meetings
- Four hour brainstorming sessions, every 2 weeks
- Development in two week sprints.

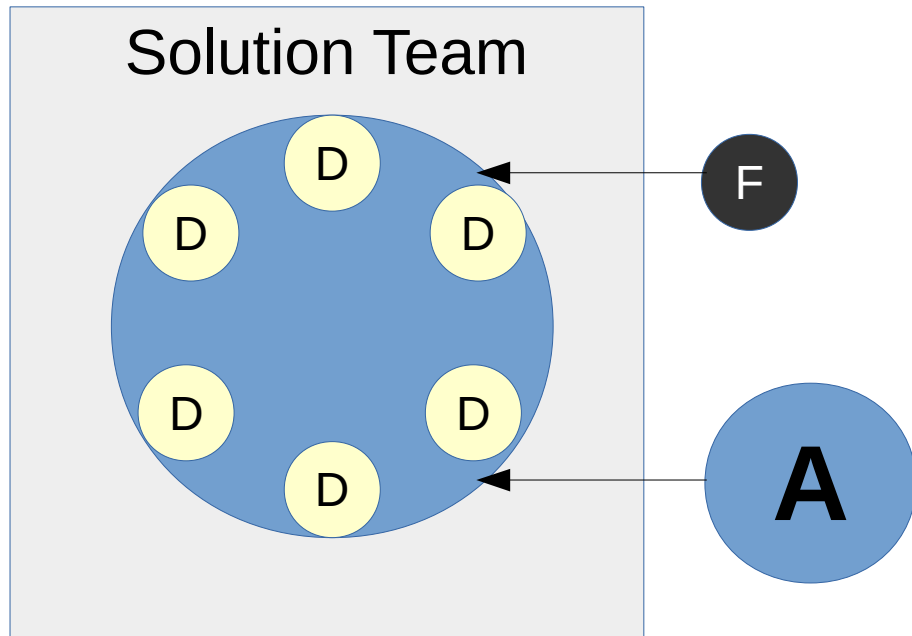
Solution Scrum Team



- Project Facilitator
- Scrum Master

- Coordinates with Project Team
- Ensures Scrum process and principles are followed
- Removes obstacles to progress.

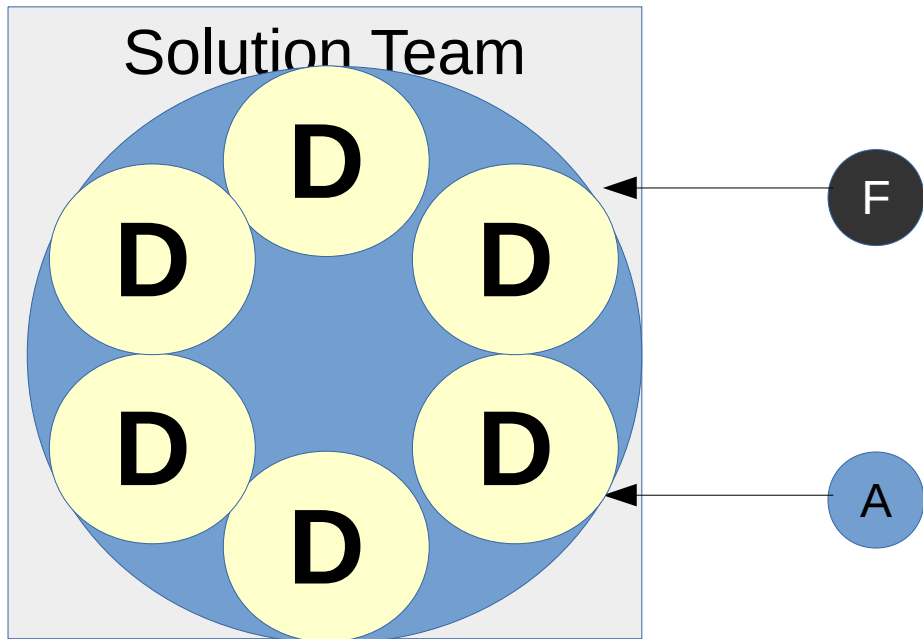
Solution Scrum Team



- Team Adviser

- Represents stakeholders (customers, devs, ...)
- Provides input to devs (“user stories”)
- Adds to product (deliverable) backlog

Solution Scrum Team



- Developers
 - Analyse
 - Design
 - Develop
 - Test
 - Communicate
 - Document
- Cross-functional (multiple skill sets)
- Deliver Potentially Shippable Increments (PSI)
- Escalate issues to Project Team via Project Facilitator (Scrum Master)

Impending Tasks Solution Teams

