Open XAL Project Architecture

Thomas Pelaia II, Ph.D.

Open XAL Meeting

November 14, 2013

Managed by UT-Battelle
for the Department of Energy

OAK RIDGE National Laboratory

Motivation

- Common Core is too large
- Need support for Site Specific Extensions and Plugins
- Need mechanism for assembling and sharing a project
  - Site specific applications, services, extensions and plugins
  - IDE Configuration
- *Identity Preservation and Independence*

Goals

- New features
  - Support Extensions and Plugins
  - Smaller Common Core
  - Mechanism for assembling and sharing projects
- Maintain
  - Simple Command Line Build
  - Clean layout

Primary Constructs

Construct	Description
Application	Launched by user, Graphical Interface
Service	Runs continuously, headless, includes extension
Core	Common Open XAL library
Extension	Optional addition to the Core, Core has no dependency
Plugin	One of each type of plugin is required by Core at runtime

Extension

- May depend on core, extensions and plugins
- Core has no dependency on extensions
- Apps and Services may depend on extensions
- May include libraries, resources and source code
  - Libraries should be completely wrapped (e.g. jmdns)
- Two types
  - Pure
  - Service

Pure Extension

- Placed under top level *extensions* directory
- Package prefix: xal.extension.<extension-name>
- Several existing packages became extensions
  - All extension package names changed
  - Some packages also got reorganized
  - Applications modified due to package changes

Service Extension

- Associated with a service
- A service's protocol is an extension
- A service's other supporting code may be an extension
- Placed at *extensions* directory under its service's directory
- Package prefix: xal.service.<service-name>

Plugin

- May depend on core, extensions and plugins
- Core has runtime only dependency on plugin families
- Apps and Services may depend directly on plugins
- May include libraries, resources and source code
  - Libraries should be completely wrapped (e.g. jca, caj)
- Two types
  - Solitary
  - Family Member

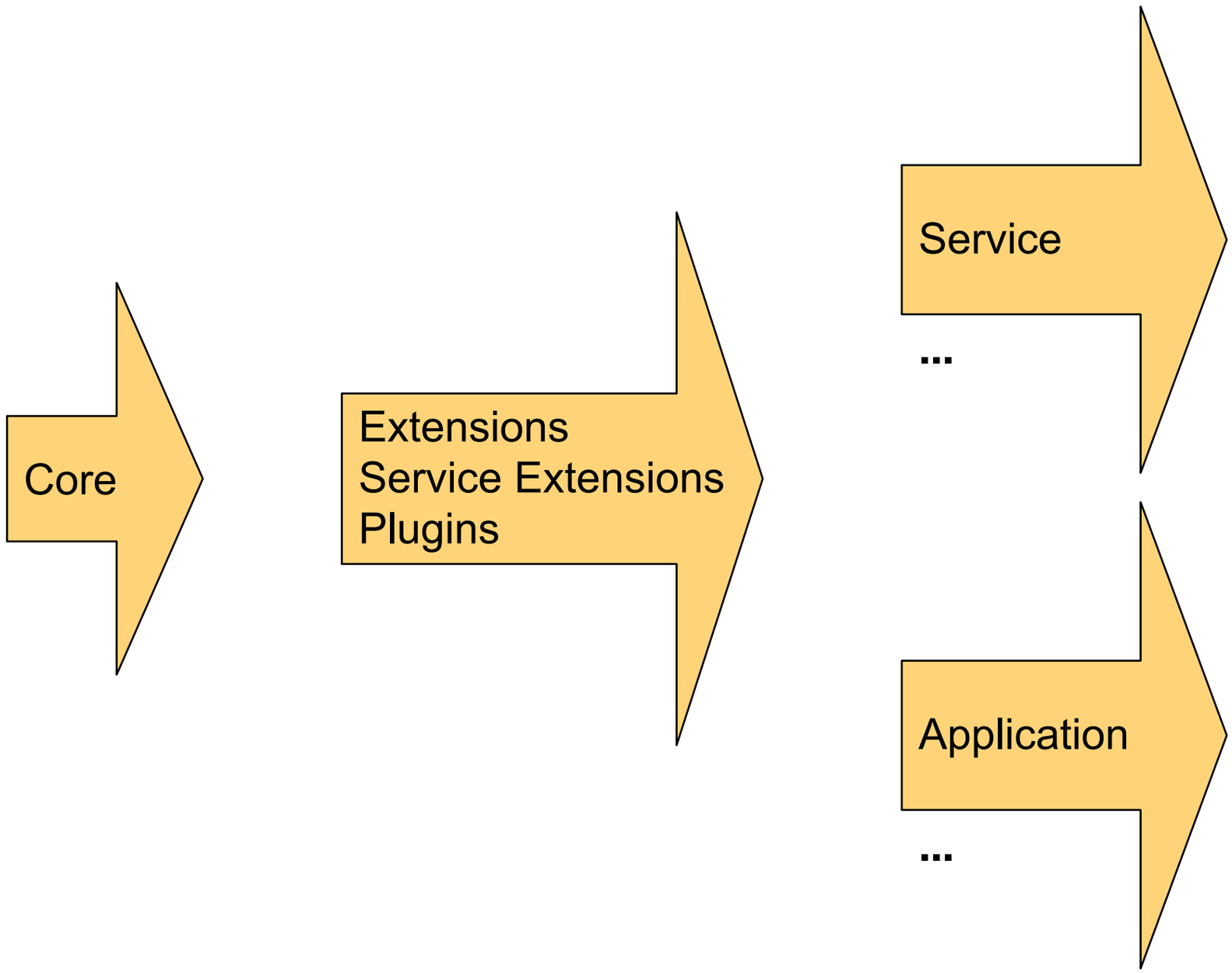
Solitary Plugin

- Only one plugin for a given family may be included
- Core references a plugin family class to be implemented by just one plugin (e.g. channel factory)
- Two source code package prefixes to supply
  - xal.<core package tree>
  - xal.plugin.<plugin-name>
- Example JCA Plugin
  - Virtual Accelerator changed to use plugin instead of underlying CAJ calls

Family Member Plugin

- Multiple plugins for a given family may be included
- Core references a plugin family indirectly through configuration files (e.g. database configuration)
- Only one source code package prefix to supply
  - xal.plugin.<plugin-name>
- Database Adaptor Plugins
  - oracle, mysql
  - change database config file for adaptor class matching new package name

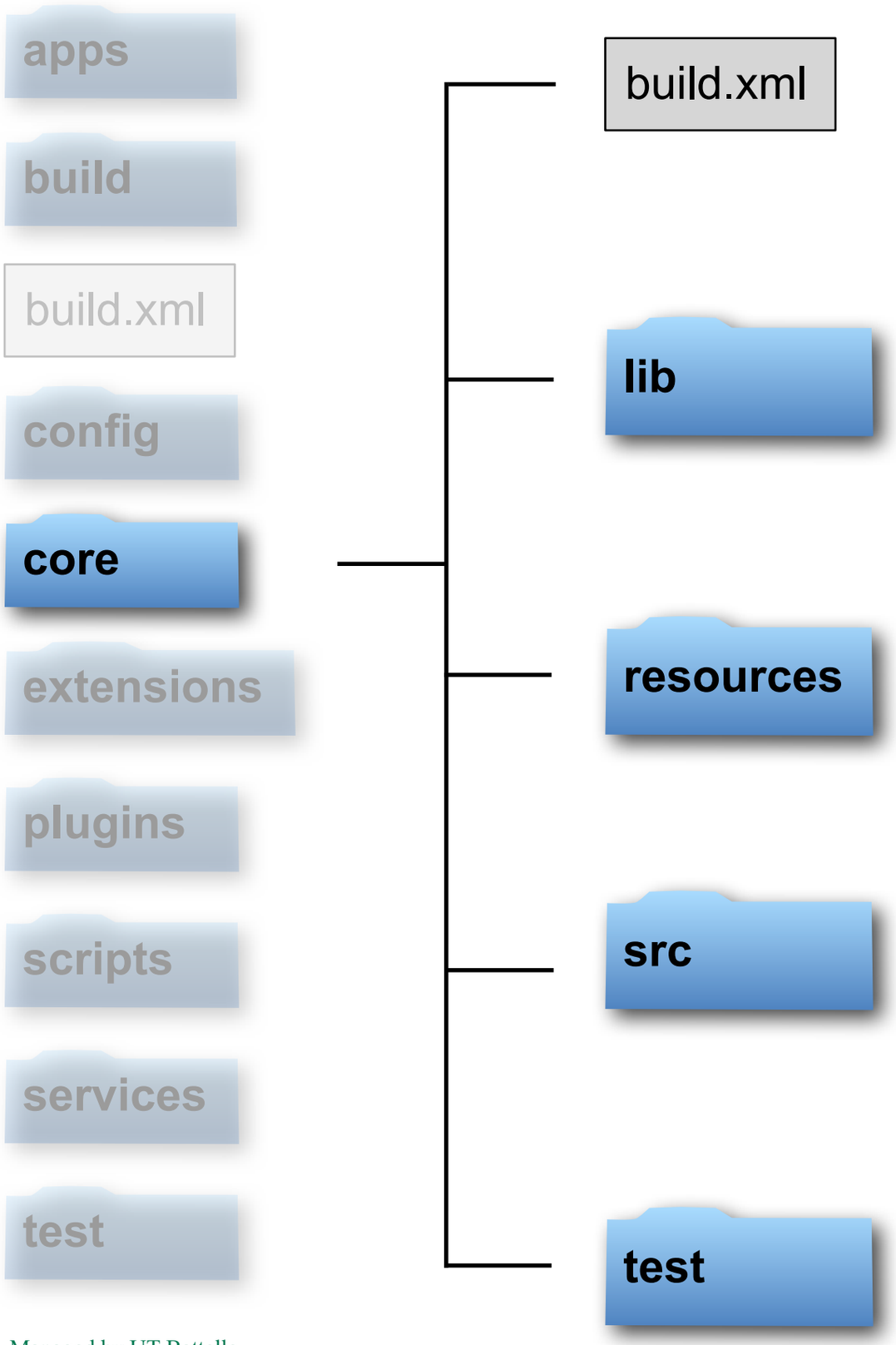
Build Phases and Spaces



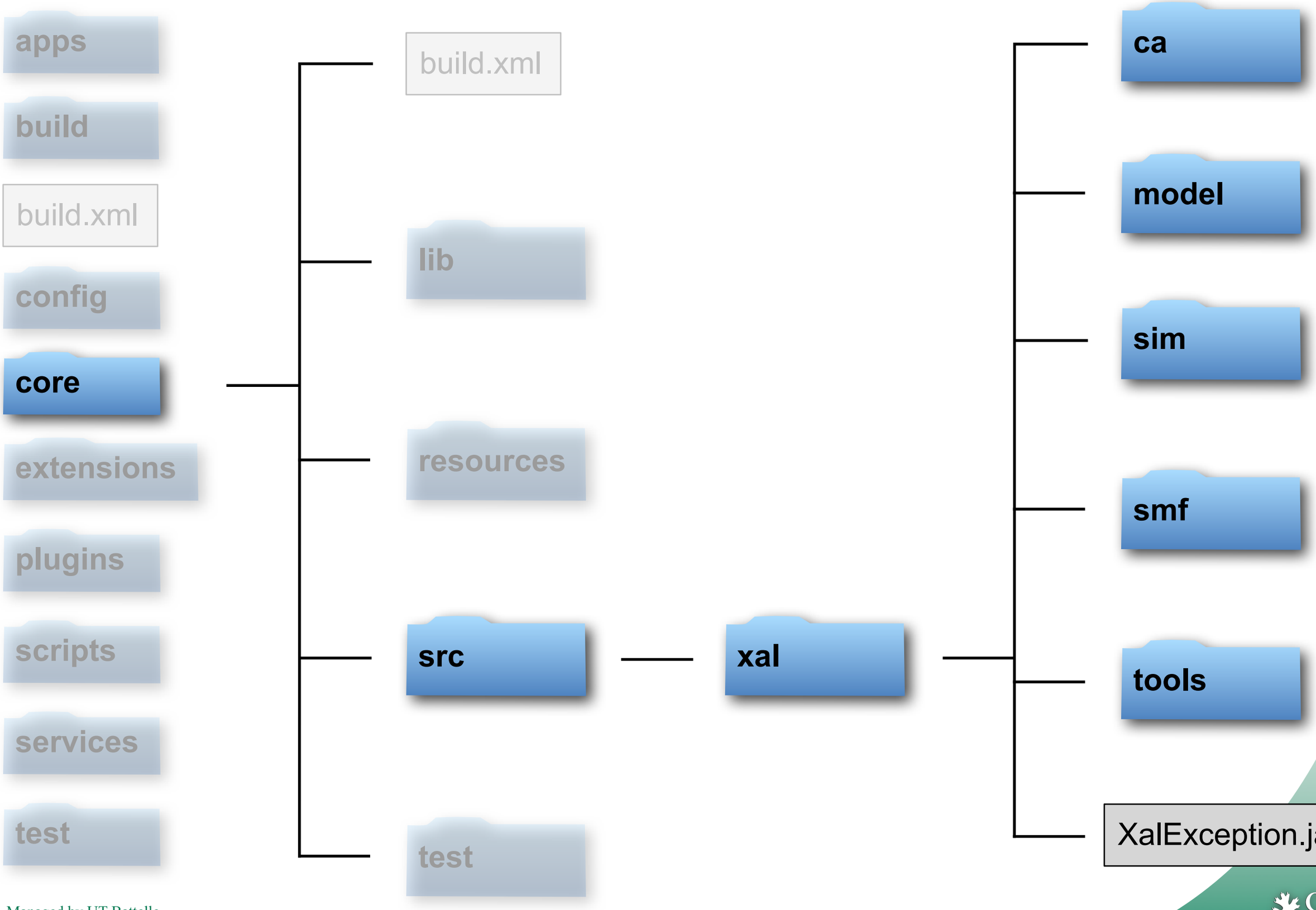
Project Layout

- apps
- build
- build.xml
- config
- core
- extensions
- plugins
- scripts
- services
- test

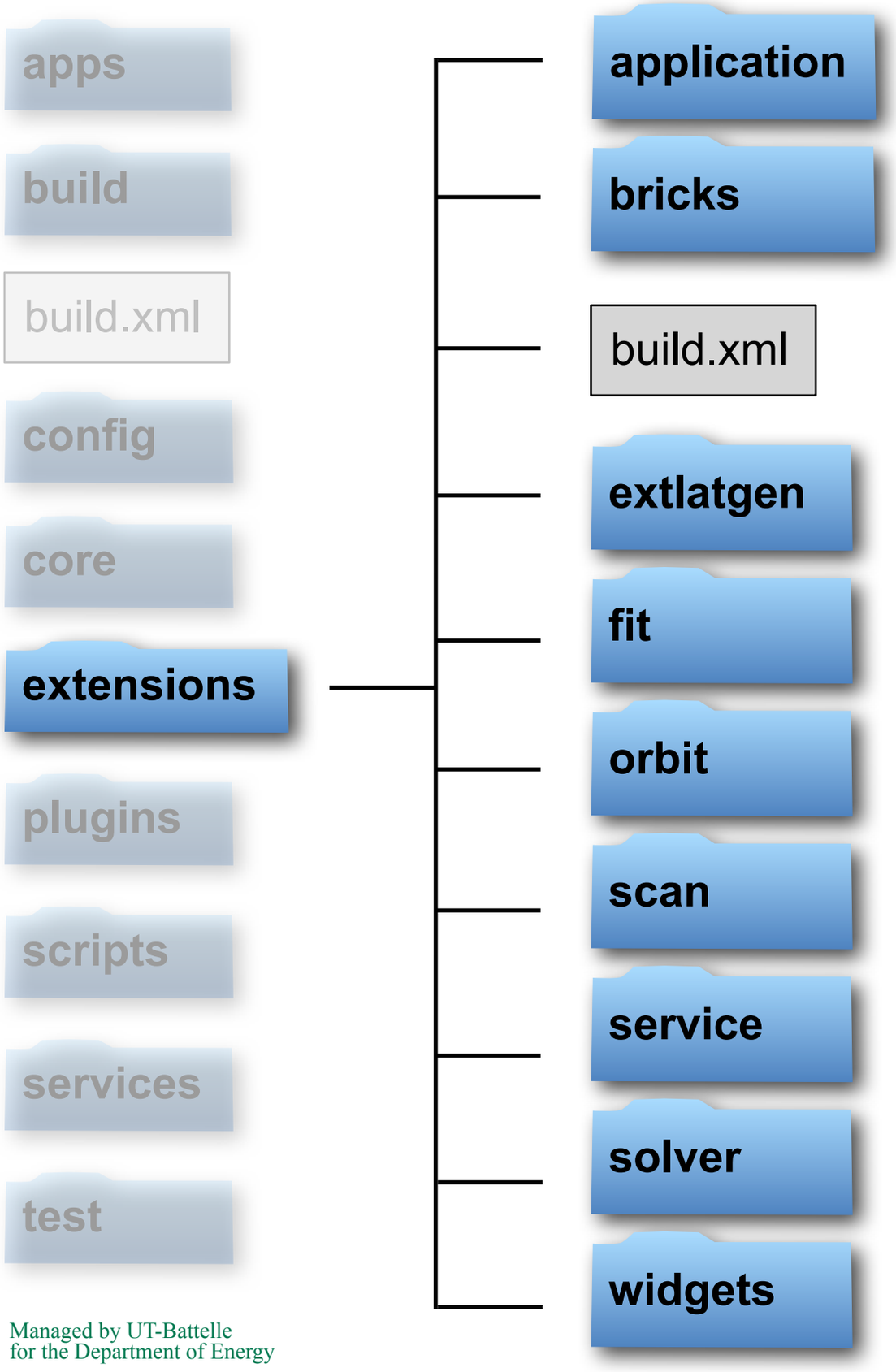
Project Layout - Core



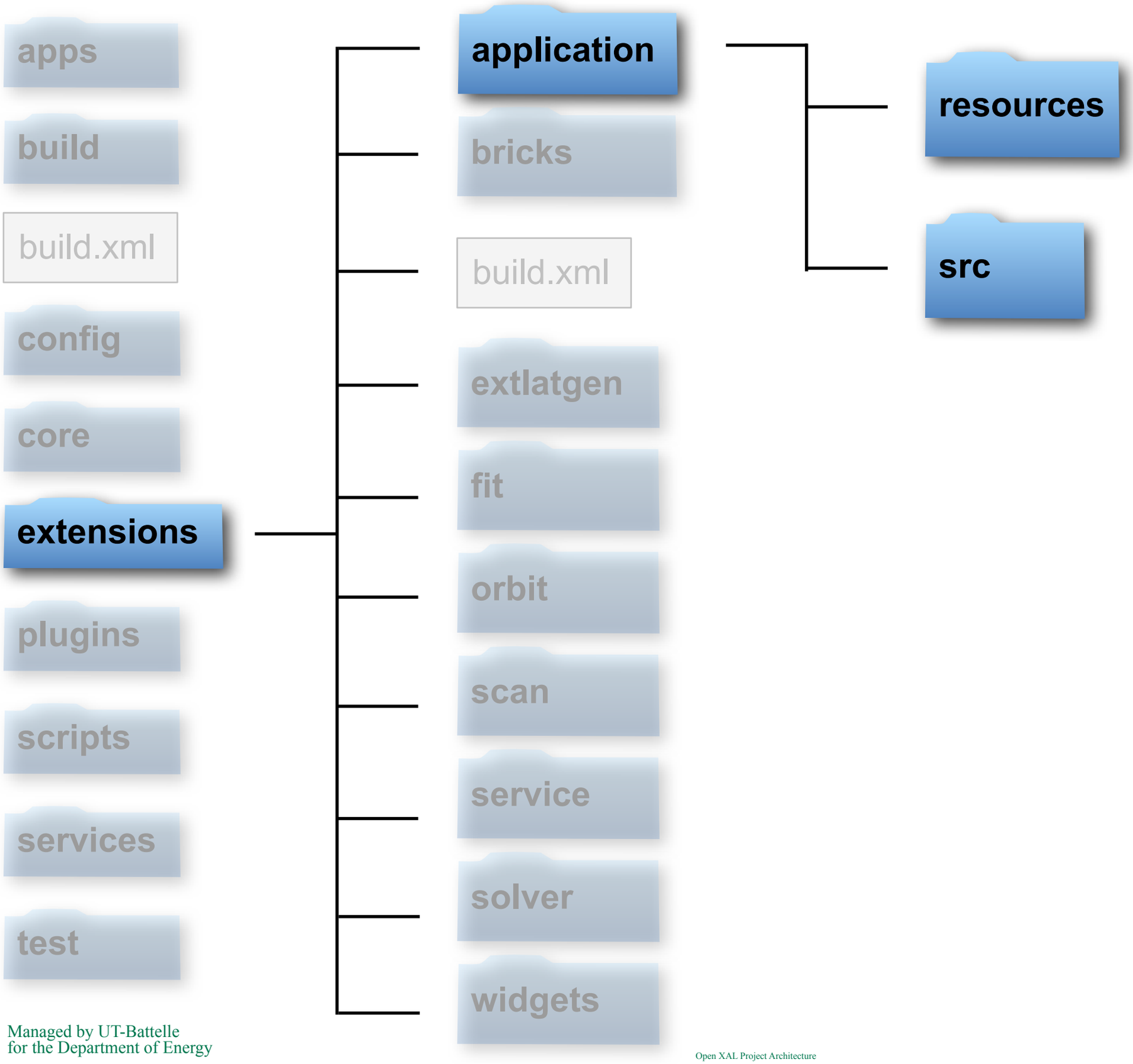
Project Layout - Core



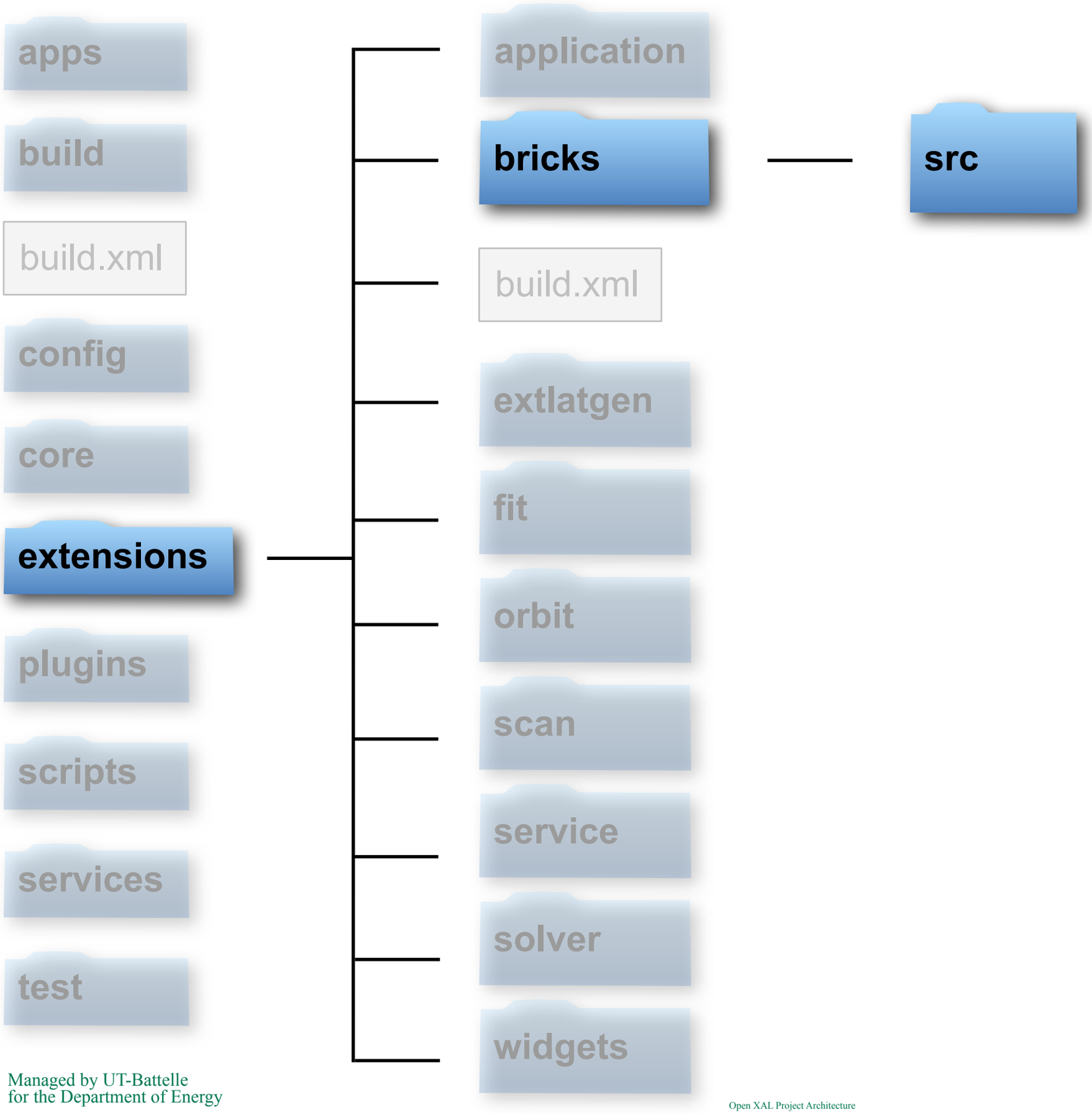
Project Layout - Extensions



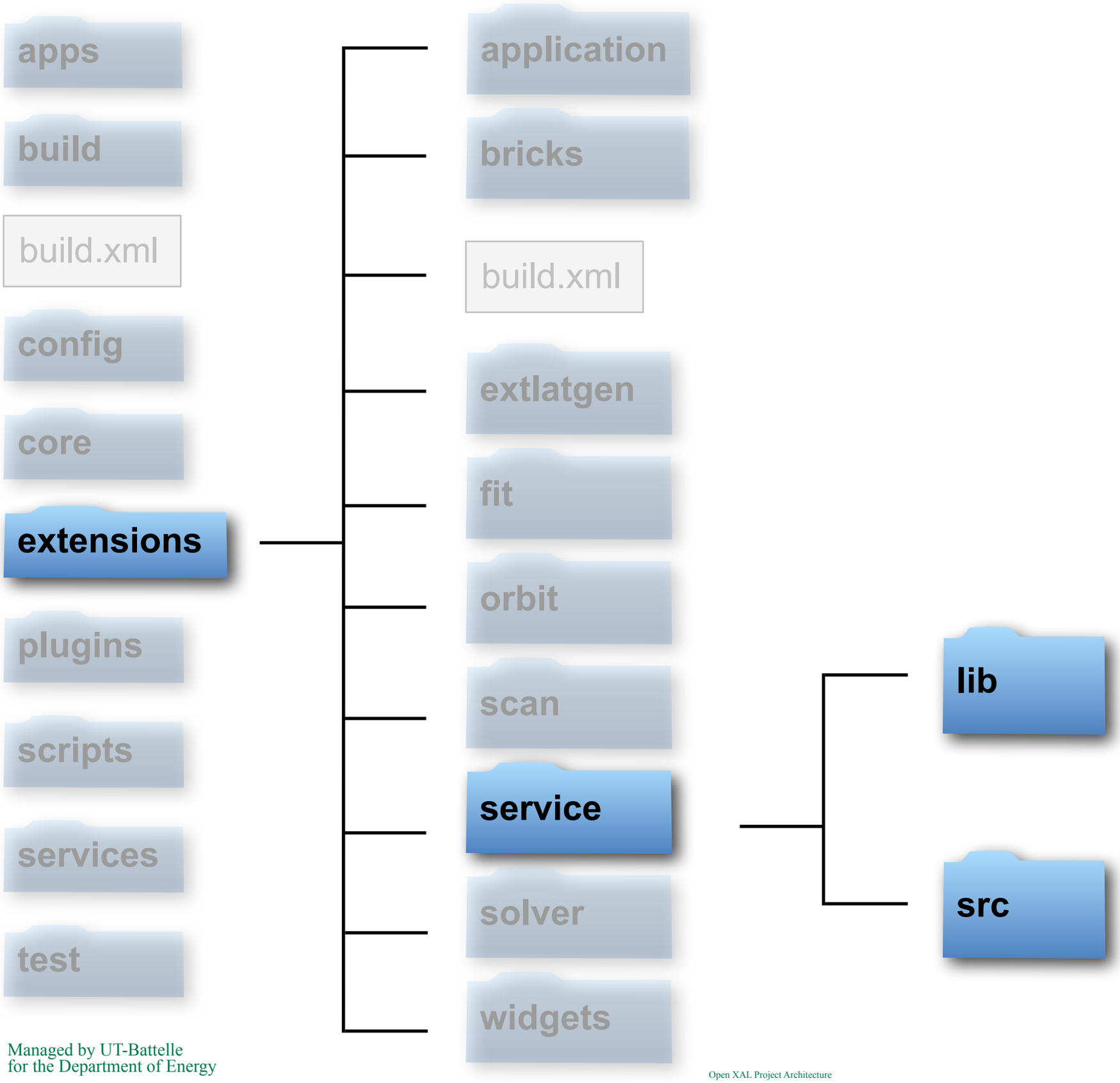
Project Layout - Extensions



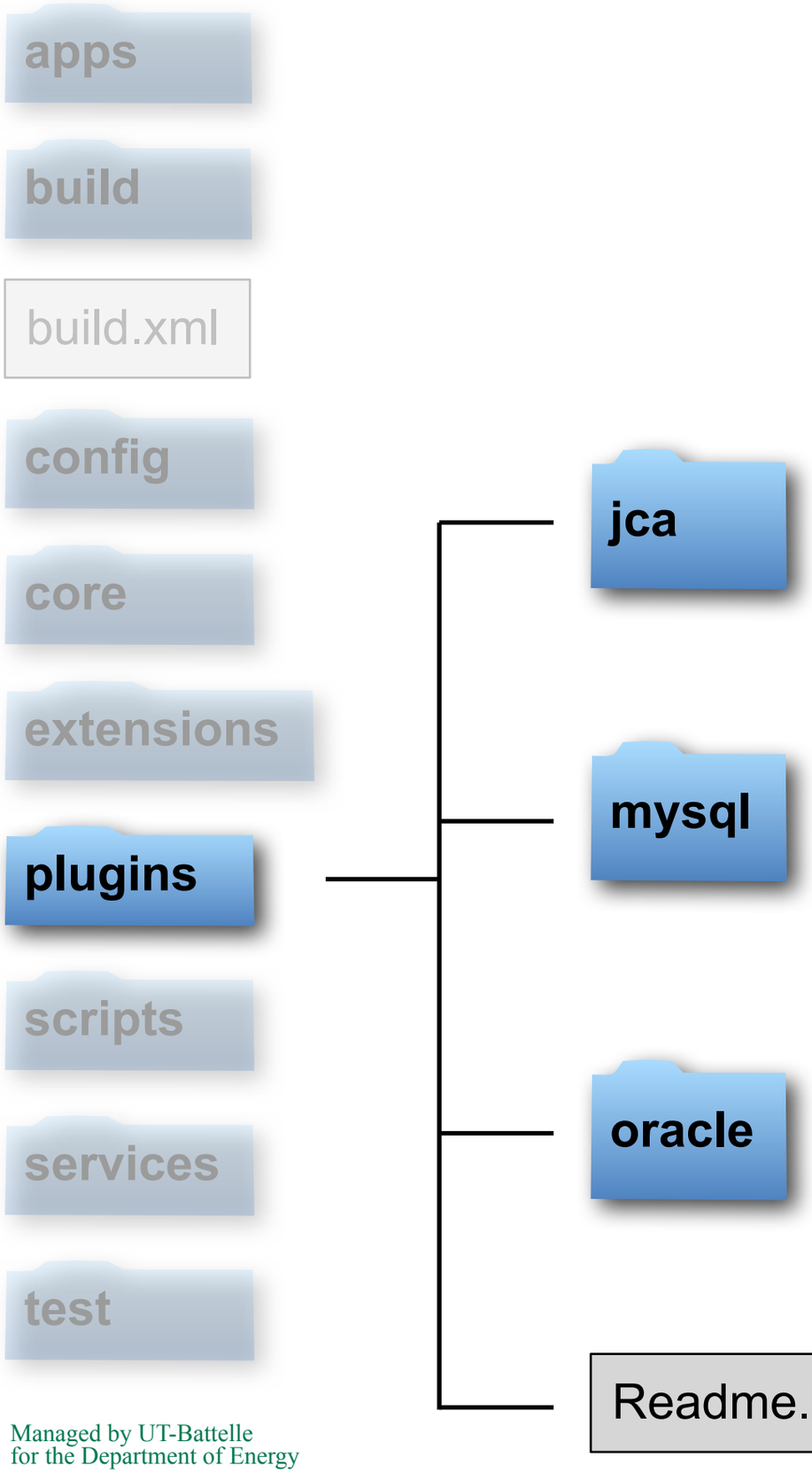
Project Layout - Extensions



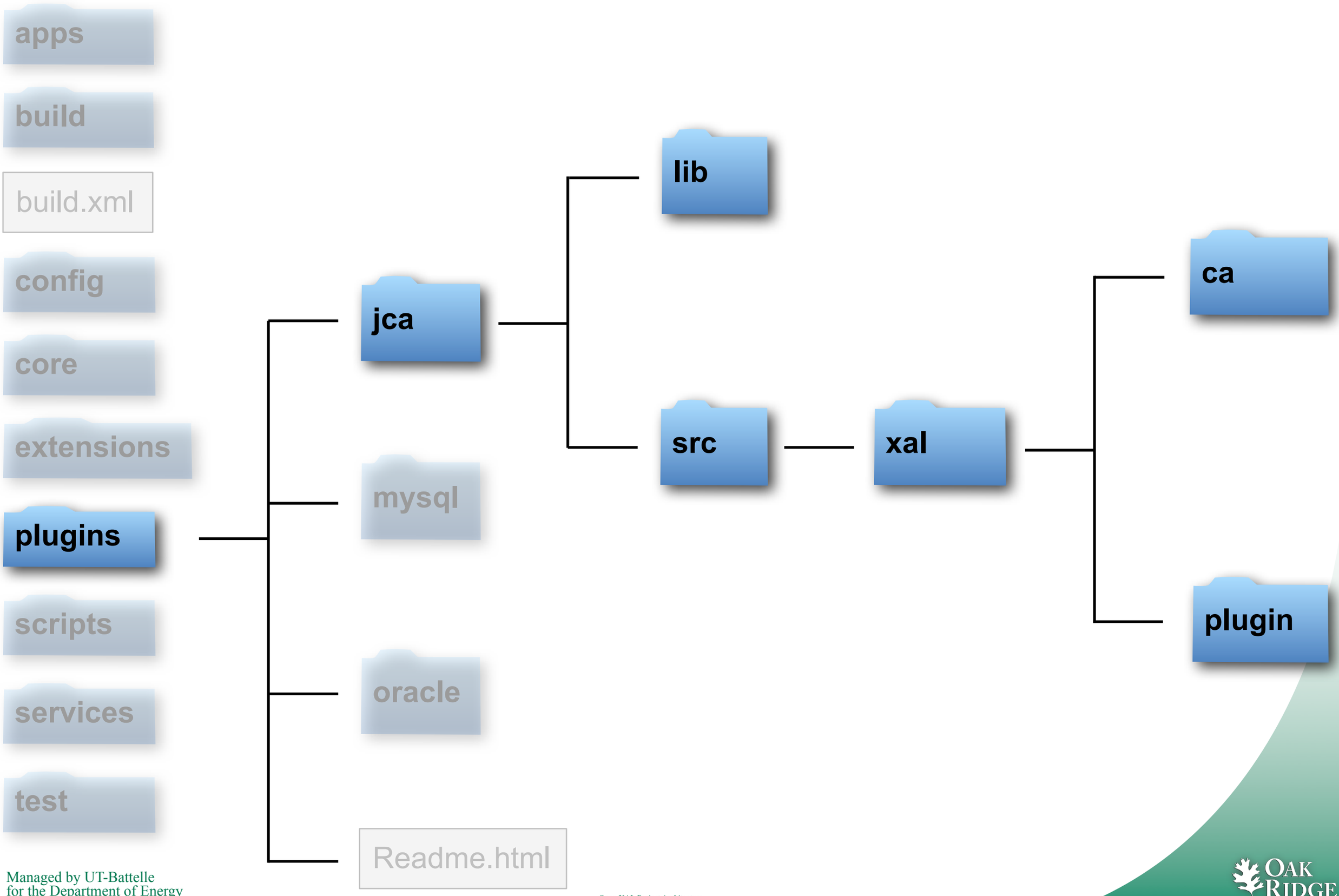
Project Layout - Extensions



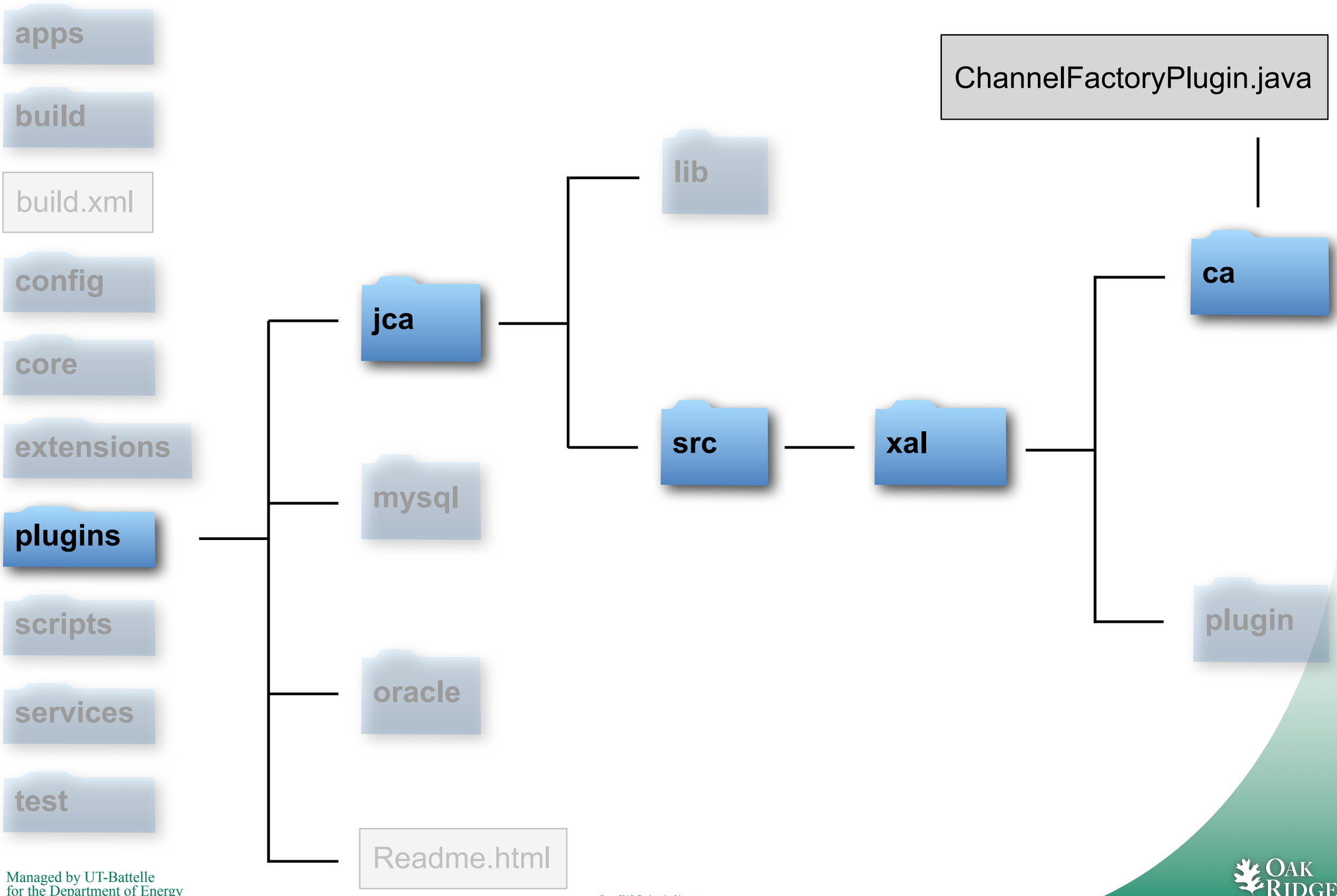
Project Layout - Plugins



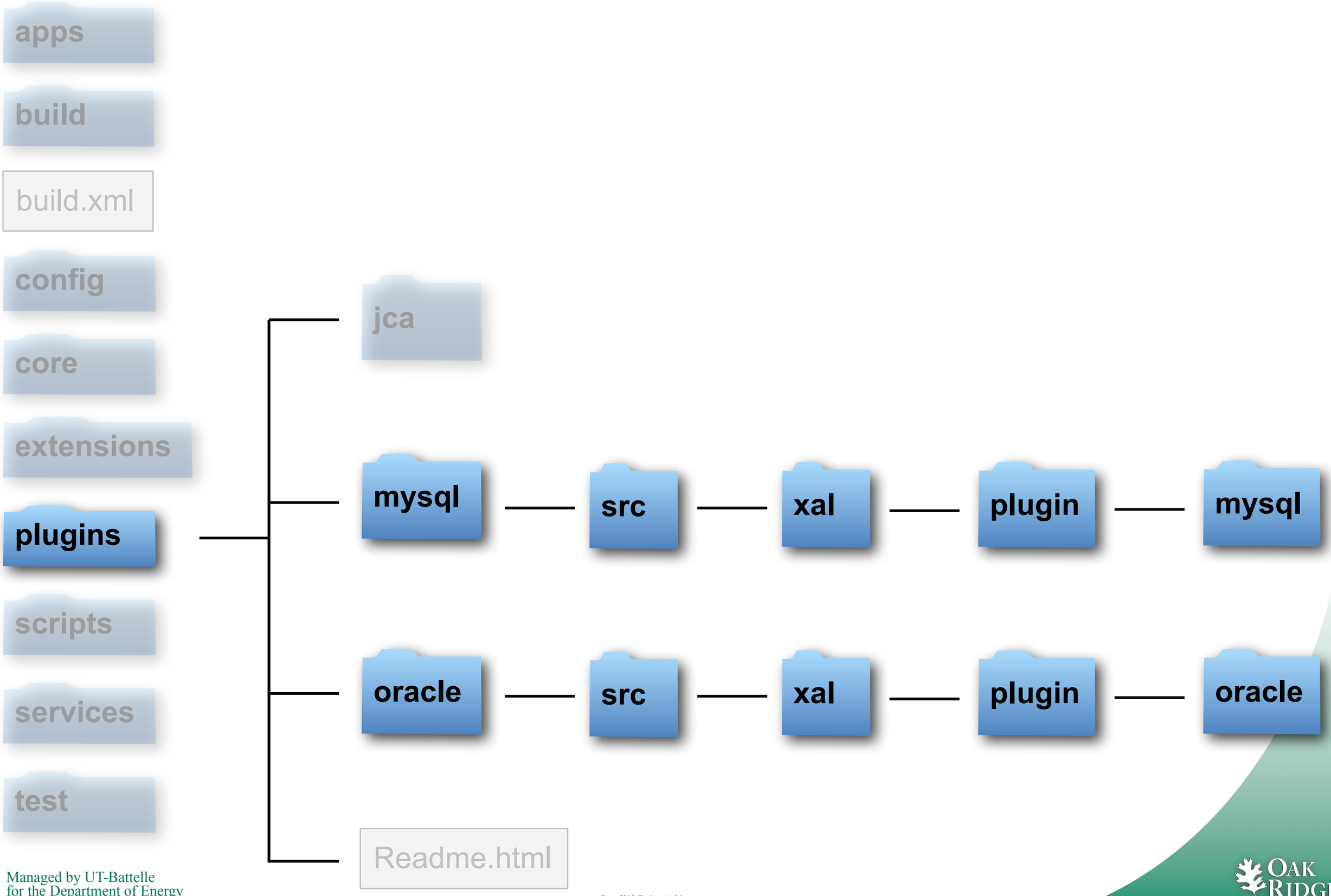
Project Layout - Plugins



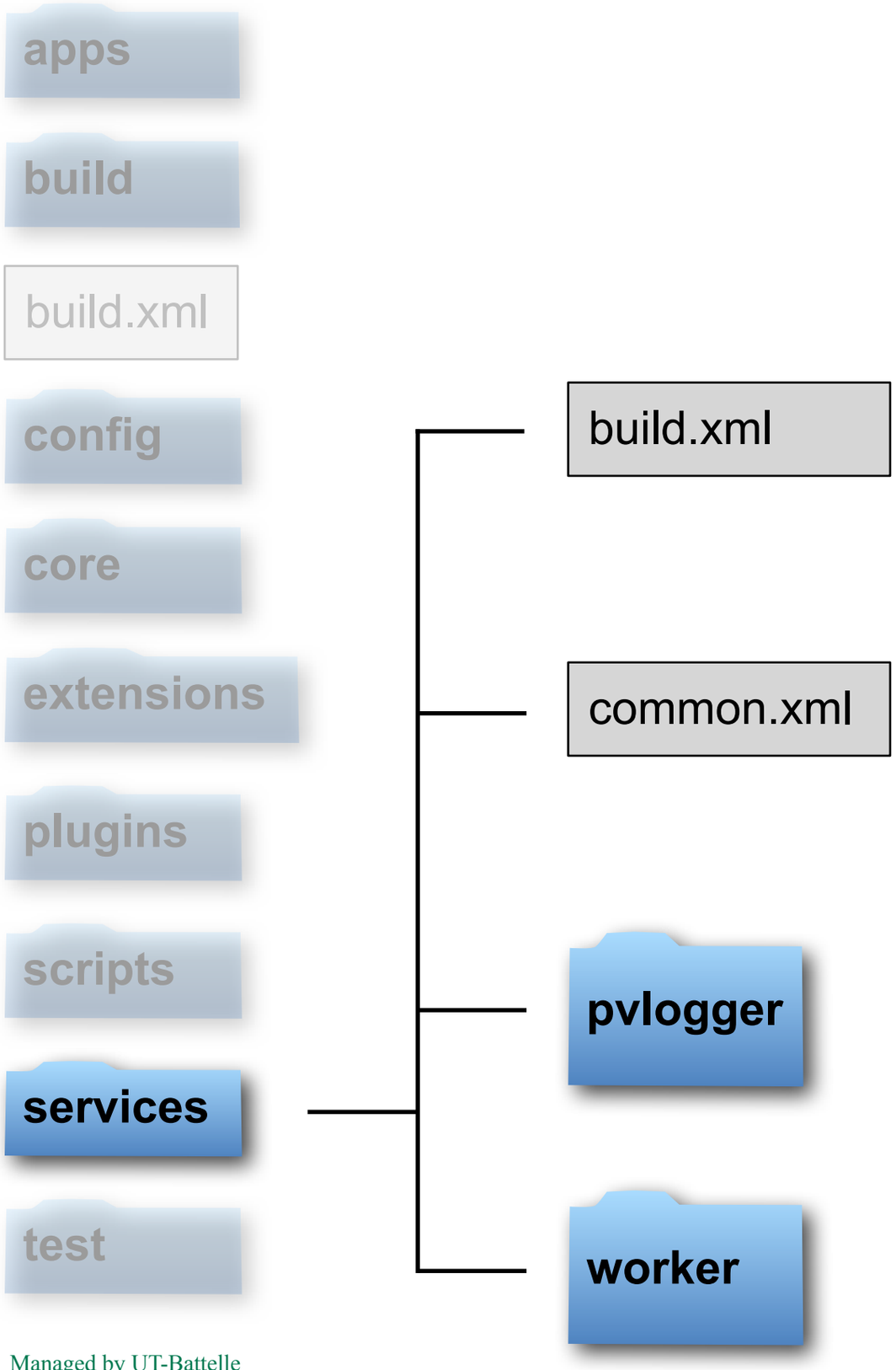
Project Layout - Plugins



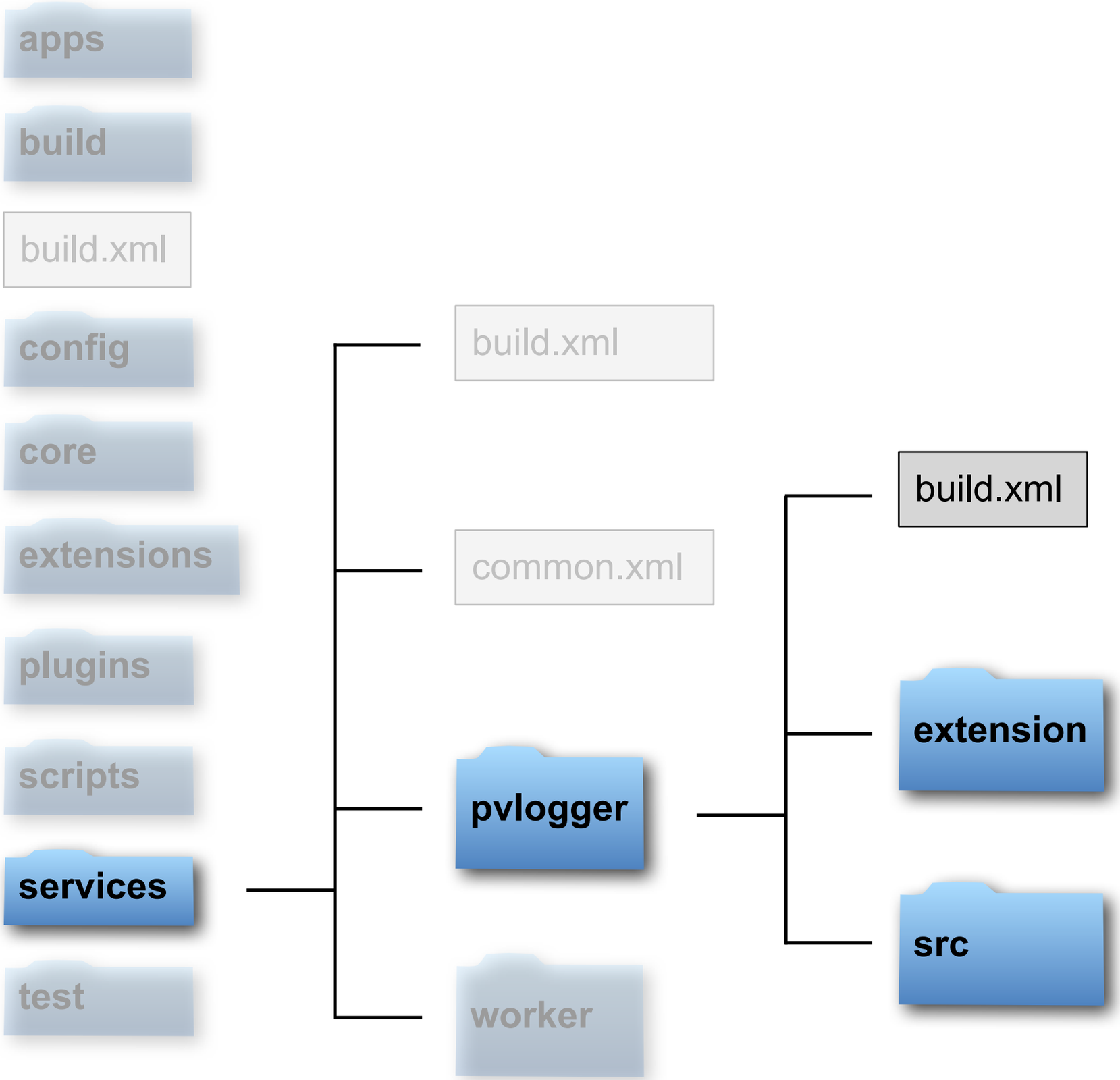
Project Layout - Plugins



Project Layout - Services



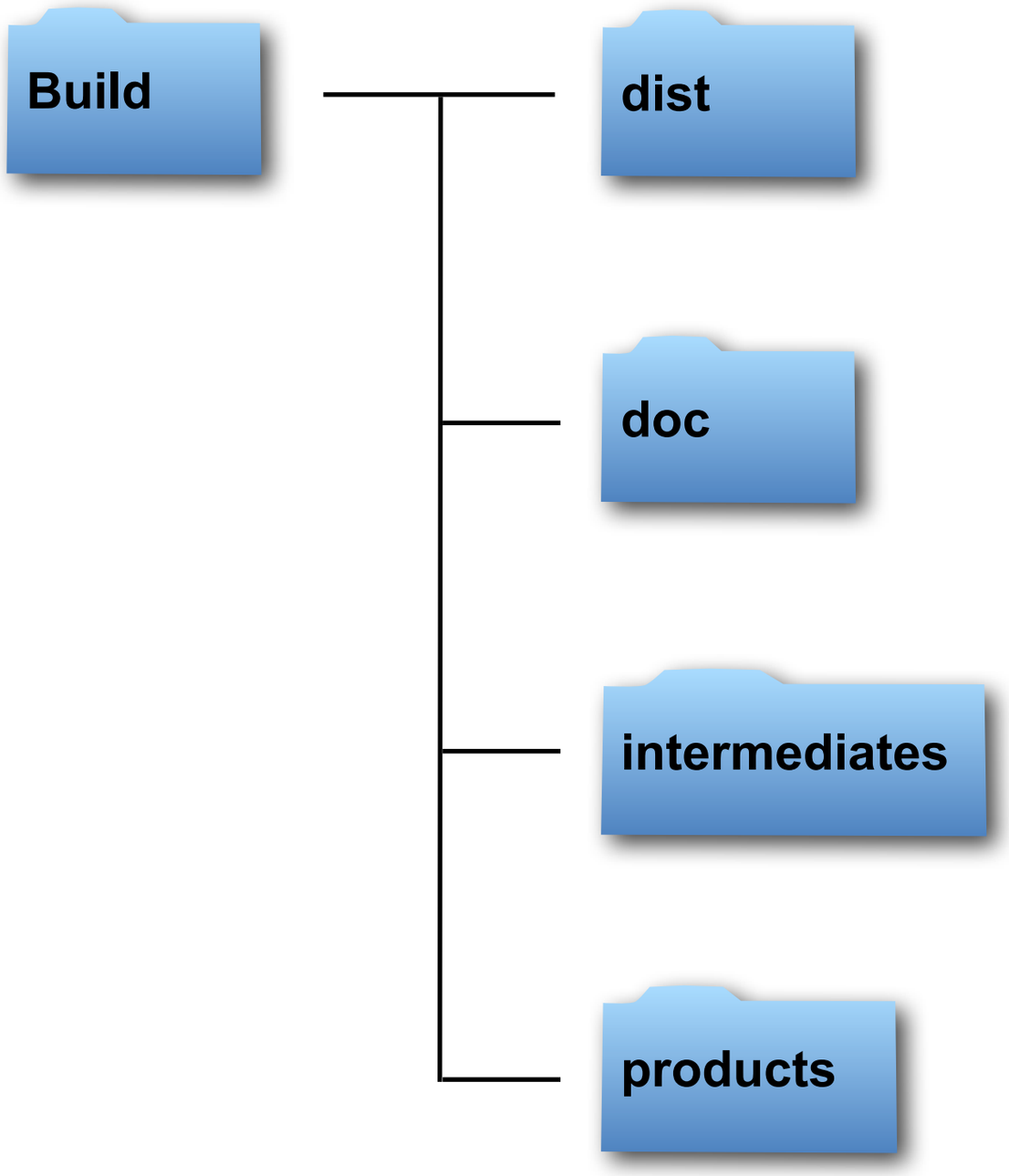
Project Layout - Services



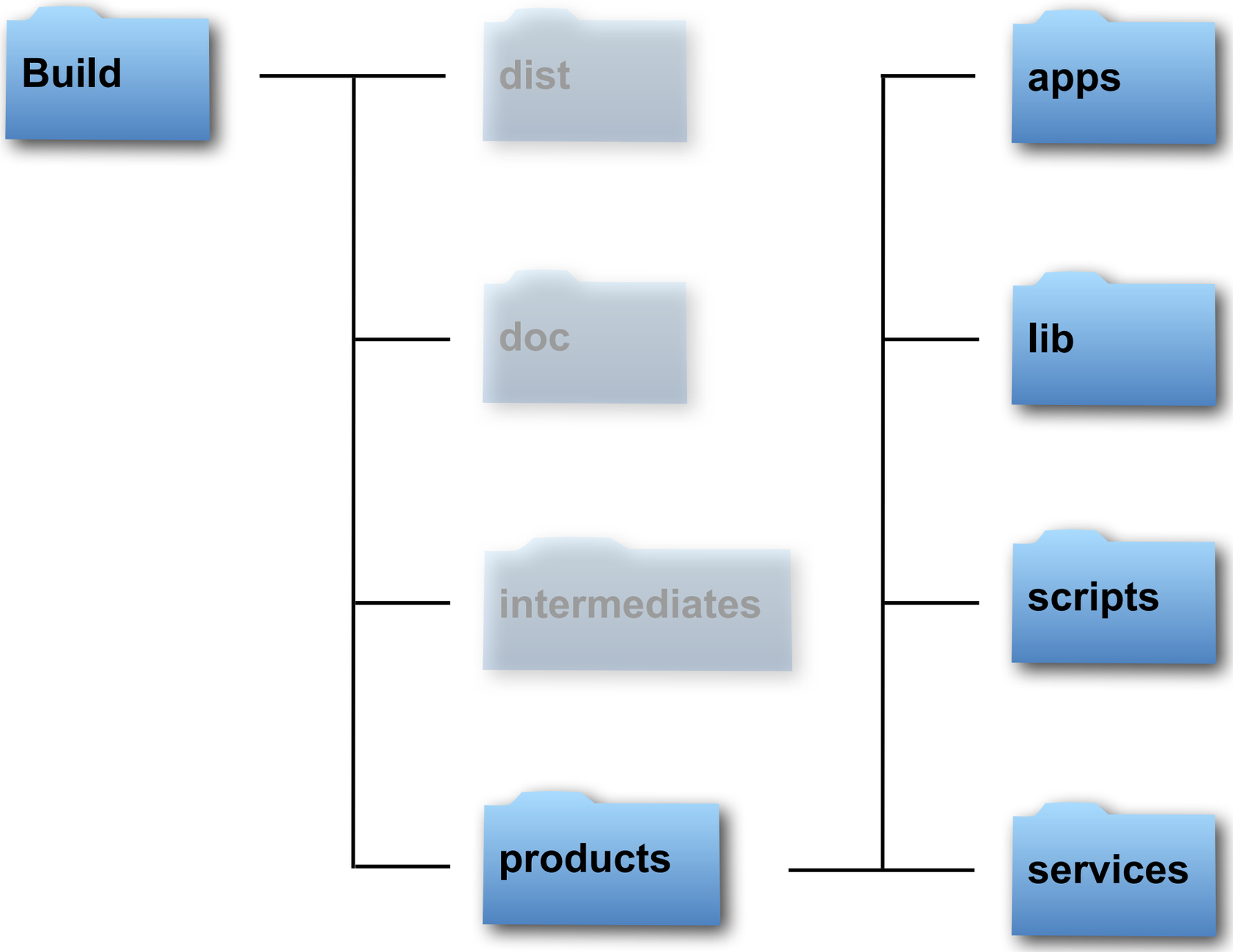
Ant Build System Changes

- New *intermediates* build subdirectory
- Build *jars* renamed *products*
- Single shared library combining core, extensions and plugins
- Javadoc - entire shared library
- *jar-resources* target for each build file constructing corresponding *resources.jar* intermediate
- JUnit libraries moved from core/test to top level test

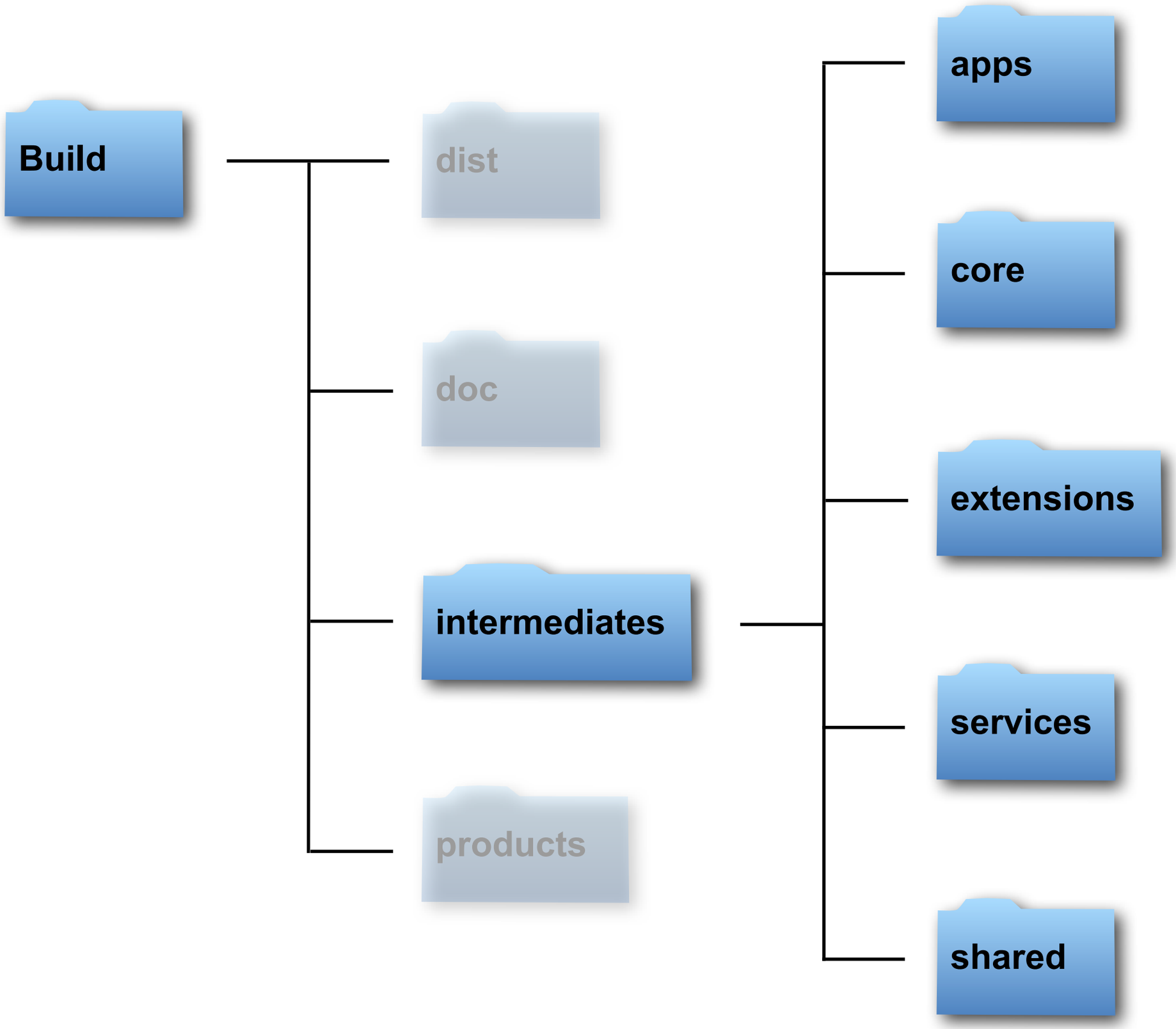
Build Directory Hierarchy



Build Directory Hierarchy - Products



Build Directory Hierarchy - Intermediates



Code Sharing Goals

- Share common core, applications, services, extensions and plugins
- Pick and choose among other components
- Add site specific components
- Maintain reference base for certifying code and quick start

Code Sharing Proposal

- Git Subtree seems well suited
  - Each component may reside in its own branch and repository
    - Better history management
    - Easier task distribution
  - Easily push and pull components
- Complete projects including IDE support can also be maintained

Git Subtree Mechanism

- Normal Git Repository (nothing special)
- Commands push/pull specified subdirectory files and commits to/from another repository and branch
- Branch commits truncated appropriate to subtree

Common Git Subtree Commands

Add files and commits to the specified path from the specified repository branch:

```
git subtree add -P <path> <repository> <branch>
```

Pull files and commits to the specified path from the specified repository branch:

```
git subtree pull -P <path> <repository> <branch>
```

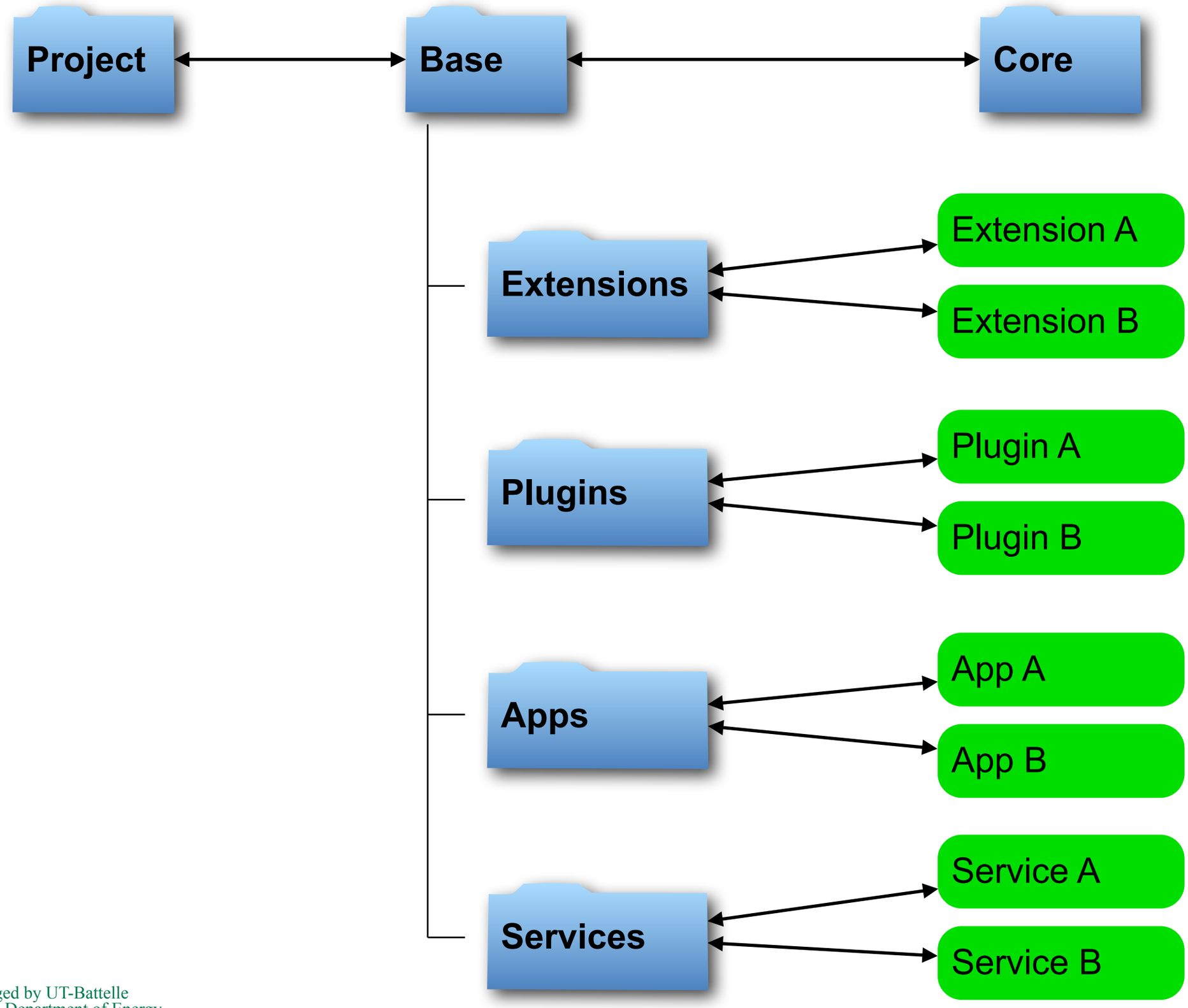
Push files and commits at the specified path to the specified repository branch:

```
git subtree push -P <path> <repository> <branch>
```

Reference:

https://github.com/git/git/blob/master/contrib/subtree/git-subtree.txt

Generic Open XAL Git Subtrees



Current Repository Modules

Type	Repository Prefix	Examples	Comment
Project	project	xcode	IDE Specific
Base		openxal	Ant based
Core		core	Stable, Common
Extension	extension	application, bricks, extlatgen, fit, orbit, scan, service, solver, widgets	Site specific additions
Plugin	plugin	jca, mysql, oracle	
Application	app	bricks, dbbrowser, extlatgenerator, knobs, launcher, mtv, opticseditor, opticsswitcher, orbitcorrect, pvhistogram, pvlogger, scan1d, scan2d, scope, virtualaccelerator, xyzcorrelator	
Service	service	pvlogger, worker	

Code Sharing Workflow Example
Clone Existing Project

```
# clone the existing project with the default components
git clone ssh://YourID@git.code.sf.net/p/xaldev/project.xcode openxal-xcode

# work on a new branch
git checkout -b site.sns.master
```

Directory Structure:

Open XAL.xcodeproj

Open XAL Base

Supporting Xcode Scripts

Code Sharing Workflow Example
Add Energy Manager Application

```
# define remote to application for convenience
git remote add sf.energymanager https://YourID@git.code.sf.net/p/xaldev/
app.energymanager

# define remote to Open XAL base
git remote add sf.openxal https://YourID@git.code.sf.net/p/xaldev/openxal

# add the Energy Manager application from the remote to our project
git subtree add -P openxal/apps/energymanager sf.energymanager master

# Push our new branch back to the project repository
git push origin site.sns.master

# Push the base back to remote repository with a new branch: site.sns.master
git subtree push -P openxal sf.openxal site.sns.master
```

Code Sharing Workflow Example
Pushing Energy Manager Changes Back

After making site specific changes to the Energy Manager application:

```
# Push changes back to the project repository
git push origin site.sns.master

# Push the base back to remote repository with a new branch: site.sns.master
git subtree push -P openxal sf.openxal site.sns.master

# Push the application back to the repository with new branch: site.sns.master
git subtree push -P openxal/apps/energymanager sf.energymanager site.sns.master
```

Now there are three remote repositories with site specific branches:
- project.xcode
- openxal
- app.energymanager

Future Related Tasks

- Complete support for unit tests beyond core
- Add a top level directory for samples (scripts and Java source code)