Legion Source Control

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- Requirements and implications
- Data structures and architecture
- Roadmap

Requirements

- Unified code & data solution
- Large binary files: Central database
- Support for live workflows: Branches
- Predictable merges: Central locking across branches
- Support for distributed build tools: Shared virtual workspaces

Requirement: Unified code & data solution

- Code and data have interdependencies
- Atomic changes across code & data in a single commit
- Unified tools and processes for all crafts

Requirement: Large binary files

- Fully distributed history is impractical when dealing with large binary files
- Central database and shallow (or even virtual) workspaces are the way to go here

Requirement: Support for live workflows

- Branches!
- Git branches are very efficient in size and speed

Requirement: Predictable merges

- Conflicts are the dark side of branches
- Central locking à la perforce is not good enough with binary files
    - Only pushes back the conflict to the branch merge
- Solution: locking across branch families
    - Implicit lock domains based on explicit branch parenting
    - Attached branches share a lock domain
    - Detaching a branch creates a new lock domain
- Even better: app metadata `inside` the lock
    - Allows to override/augment lock when conflict-free merge is guaranteed

Requirement: Support for distributed build tools

Problem statement

> Hundreds of instances of a microservice are spawned to work on a small part of the data kept under source control. How can we give them efficient access in read and write?

Shared, virtual workspaces

Like a local workspace, it's a set of modifications based on a branch.

- Unmodified files are fetched on demand.
- No concurrency guarantees.
- Makes possible tight collaboration workflows
  - one workspace shared by many people
  - auto-sync workspace that's always on latest (except for modified files)

Non-requirements (for now)

- Access control
- On-site cache or commit servers
- CI/CD specific features
- Task tracking integration

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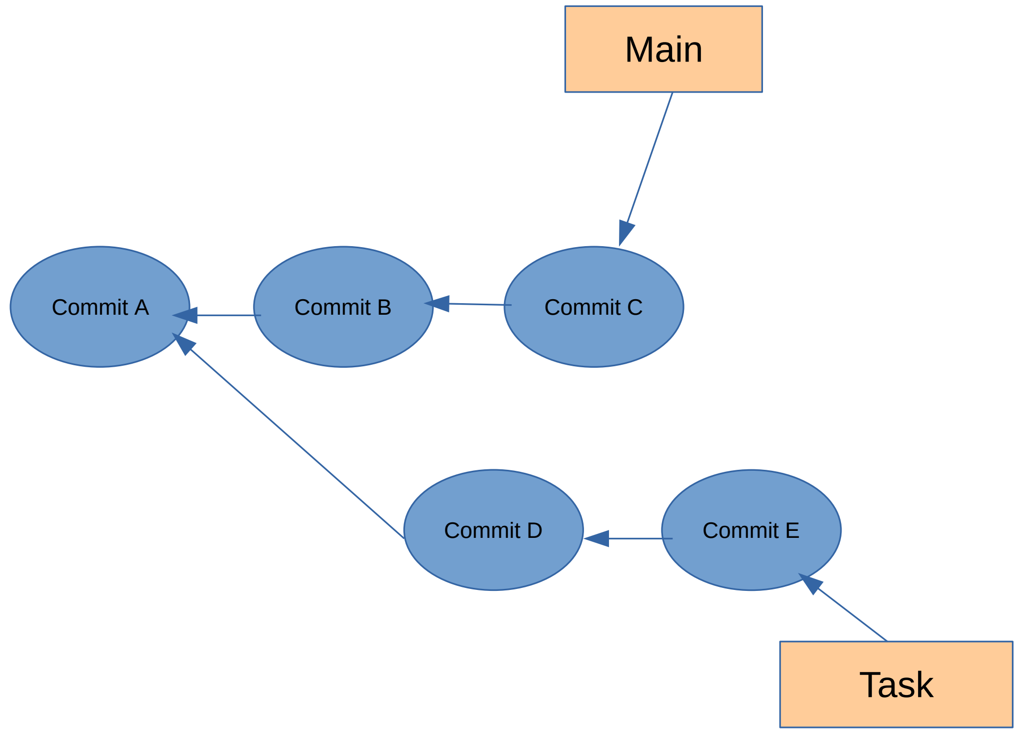
Data: commit

> like git, but centralized

- branch has a commit pointer
- commits are back-linked
- blobs and trees are stored in content adressable storage



Data: commit

```
pub struct Commit {
    pub id: String,
    pub owner: String,
    pub message: String,
    pub changes: Vec<HashedChange>,
    pub root_hash: String,
    pub parents: Vec<String>,
    pub date_time_utc: String,
}
```

Data: branch

```rust
pub struct Branch {
    pub name: String,
    pub head: String, //commit id
    pub parent: String,
    pub lock_domain_id: String,
}
```

Data: tree

```
pub struct TreeNode {
    pub name: String,
    pub hash: String,
}

pub struct Tree {
    pub directory_nodes: Vec<TreeNode>,
    pub file_nodes: Vec<TreeNode>,
}
```

Hash of a file node points to a blob.

Hash of a directory node points to a tree.

Every commit has a different root.

Unchanged directories refer to the same tree nodes.

Data: local workspace

- Branch name and commit
- Local changes
- Pending file resolves
- Pending branch merge
- **physical copy of all the files in the commit's tree**

Data: repository

- Trees
- Commits
- Blobs
- Branches
- Workspaces
- Lock domains