Mason
A Package Manager for Chapel

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Motivation for a package manager

- Today, shared modules are checked into repository
  - Developers must sign a CLA
  - Code must be under a compatible license
  - Code needs to be reviewed by core team

- Modules are gated for release alongside the compiler

- This hinders the ability for users to contribute/share code
● Chapel’s package manager & build tool

● Largely based off of Rust’s Cargo
  ● Prefer to not reinvent the wheel for package management design
  ● Cargo is particularly well designed
  ● Rust shares many similarities with Chapel in terms of building

● Intending to write in Chapel
  ● Begin transition to relying on Chapel for production code
Mason: Sample Workflow

- **Initialize the project directory**
  ```
  mason new [project name] ...
  ```

- **For project name foo, this produces:**
  ```
  Foo/
  
  Mason.toml
  src/
  
  Foo.chpl
  ```

- **Write your project code**

- **Build your project**
  ```
  mason build
  ```
  - This will compile `Foo.chpl`
Mason: Sample Workflow

- **Dependency management**
  - Add or remove dependencies
    
    ```
    mason add [package] [version]
    mason rm [package]
    ```
  - Pulled in and included by `mason build`
  - Dependency code is downloaded to a common pool of packages

- **Project manifest file**
  - `Mason.toml`
  - Tracks dependencies
    - Edited automatically by `mason`
    - May be edited manually
  - Stores package metadata
    - Must be edited manually (name, version, authors, license, etc.)

```toml
[package]
name = "hello_world"
version = "0.1.0"
authors = ["Bradford Chamberlain <brad@chamberlain.com>"]
license = "Apache-2.0"

[dependencies]
Curl = "1.0.0"
```
Mason: Package Registry

● Implementation
  ● Github repository of package manifest files
  ● Identical to the one in the project, plus a source url field
  ● Publish a package by submitting a pull request

● Issues
  ● Namespacing
    ● First-come, first-served
  ● Versioning
    ● Semantic versioning
  ● Integrity
    ● Travis CI suite
    ● Review board
  ● Licensing
    ● SPDX
  ● Caching packages locally
  ● C dependencies

```
[package]
name = "hello_world"
version = "0.1.0"
authors = ["Brad Chamberlain <brad@chamberlain.com>"]
license = "Apache-2.0"
source = { git = "https://github.com/bradcray/hello_world", tag = "0.1.0" }
```

```
[dependencies]
Curl = "1.0.0"
```
Mason: Implementation Details

● **Lock file**
  ● `Mason.lock`
  ● “Locks in” a build configuration from the manifest
    ● Serialized DAG of all dependencies
    ● Points to specific Git SHAs
  ● Ensures repeatable builds on other machines
  ● After editing a manifest, generate a new lock
    ● `mason update`

● **Syncing commands**
  ● `mason` is a pipeline
    ● source → manifest → lock → dependency code
  ● When `mason` commands are run, keep them in sync
    ● `ex. mason add`
    ● triggers `mason update`, downloaded dependencies
Looking forward

- Pursuing mason this summer with an intern
- Looking for input & feedback from the community
- For more information, see CHIP #9
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