Mozilla Addon Builder
Definition of the Package Building System

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build — May 3, 2010

This document is under heavy development - please always download the newest version from
`http://github.com/zalun/FlightDeck/raw/master/Docs/Addon\%20Builder\%20-\%20Definition\%20of\%20Package\%20Building\%20System.pdf`
If in doubts, please take a look at the accompanied slides at
`http://github.com/zalun/FlightDeck/raw/master/Docs/Addon\%20Builder\%20-\%20Build\%20System.pdf`

1 Syntax

1.1 Objects

`x`, `y`, `z` — *represents* `[a..z]`
`m`, `n` — *represents* `[0..9]+`

`Ux` is the specific User (identified by *User:name*)

`Px` is the specific Package (identified by *Package:name*)
It should always be used within its `type` context as `Lx` — Library or `Ax` — Addon
Every Package has an associated PackageRevision[1] (identified by a triplet `Ux:Py.n`
User/Package/PackageRevision:revisionNumber)

`Mx` is the Module (identified by `Ux:Py.n:Mz` *PackageRevision/Module:name*[2])

1.2 Object identification — revision numbers and HEAD

`Ux:Py.n` defines revision of the Package.
`Ua:La.1` — First revision of Library `La` saved by `Ua`.

`Ux:Py.n:Mz` defines the precise Module revision — a Module inside the PackageRevision.
`Ua:La.1:Ma` — Module `Ma` inside the first revision of Library `La` saved by `Ua`.

`Px` $\Longrightarrow$ `Uy:Px.n` is the HEAD revision of the Package
`La` $\Longrightarrow$ `Ua:La.1` — `La`'s HEAD points to the first revision of Library `La` saved by `Ua`.

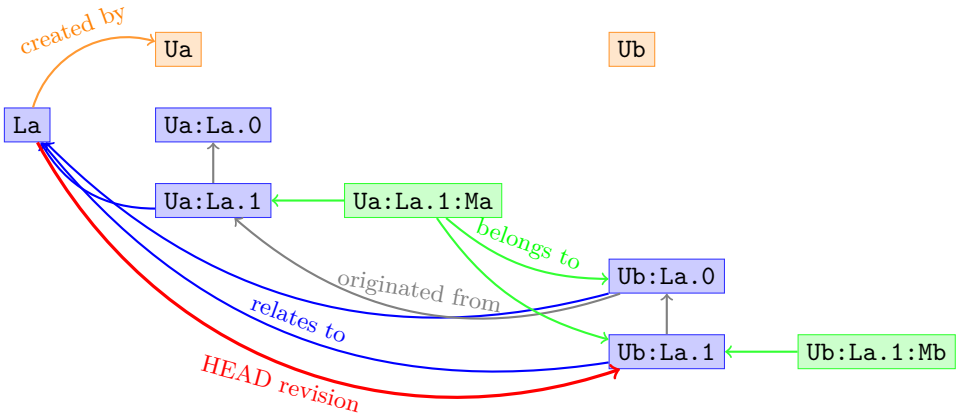
`Ux:Py.n` $\supset$ {`Ux:Py.m:Mz, ...`} Modules inside the Package revision.
`Ua:La.2` $\supset$ {`Ua:La.1:Ma, Ub:La.2:Mb`} — Second revision of Library `La` saved by `Ua` contains `Ma` saved by `Ua` in his `La`'s first revision and `Mb` saved by `Ub` in his second `La`'s revision.

[1] PackageRevision is not the same as Package version. The latter is just meta-data, a text field of PackageRevision object used only in exported `XPI`. It will no longer be used for data identification.

[2] Every data object is identified by a PackageRevision. The concept is similar to *git*'s commits. In essence, for every saved Module change, a new PackageRevision is created.

2 Relations between database objects

Graph of a sample database stage for the `La` $\Longrightarrow$ `Ua:La.1` $\supset$ {`Ua:La.1:Ma, Ub:La.1:Mb`}. Every object relates to the appropriate User.



Real world example will be more complicated. In essence a PackageRevision might (and most of the time will) be originated from more than one PackageRevisions. There is also no mention of Library dependencies.

3 Exporting XPI

Be aware that it is possible and common to export `XPI`[3] from partially unsaved data. This happens when User will use the "Try in browser" functionality. In this case `XPI` may not be send to `AMO`[4].

3.1 Creating directory structure

Directory structure should be as close as standard Jetpack SDK as possible.

Create temporary directory and copy Jetpack SDK Packages

- `/tmp/packages_{hash}`[5]`/`
  - `development-mode/`
  - `jetpack-core/`
  - `nsjetpack/`
  - `test-harness/`

3.2 Exporting Packages with Modules

1. Create Package and its Modules directories
   `/tmp/packages_{hash}/{Package:name}/`
   `/tmp/packages_{hash}/{Package:name}/lib/`

2. Use collected data to create the Manifest.
   `/tmp/packages_{hash}/{Package:name}/package.json`

[3] An XPI (pronounced "zippy" and derived from XPInstall) installer module is a ZIP file that contains an install script or a manifest at the root of the file, and a number of data files.
[4] `http://addons.mozilla.org/`
[5] hash is a random string, different for every exported `XPI`

3. Create Module files
   Iterate over the assigned Modules and create a ".js" file with its content inside Package's `lib/` directory.

4. Export dependencies
   Iterate over Libraries on which a Package depends and repeat this section (*Export the Package with Modules*) for every Library.

3.3 Building XPI

System is already in a virtual environment knowing about Jetpack SDK. It is enough to change directory to `/tmp/packages_{hash}/{Package:name}/` and call `cfx xpi`. The `{Package:name}.xpi` file will be created in current directory. Its location is then send to the front-end to be used in further actions. Usually calling the *FlightDeck Addon*[6] to download and install the `XPI`.

3.4 Uploading to AMO

Create `XPI` from the database object. Use `mechanize` lib to login to `AMO`and upload the file faking it was done directly from the browser.

4 Editing Package and its Modules

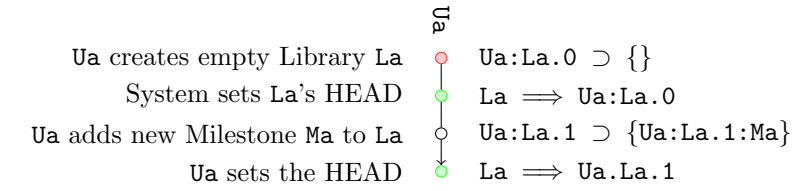
How database evolves by changing the Packages and Modules. This description will be used later to design structure and functionalities of the system.

4.1 Starting point

All next scenarios start from the `Ua:La.1` defined as below.

`La` $\Longrightarrow$ `Ua:La.1` $\supset$ {`Ua:La.1:Ma`}

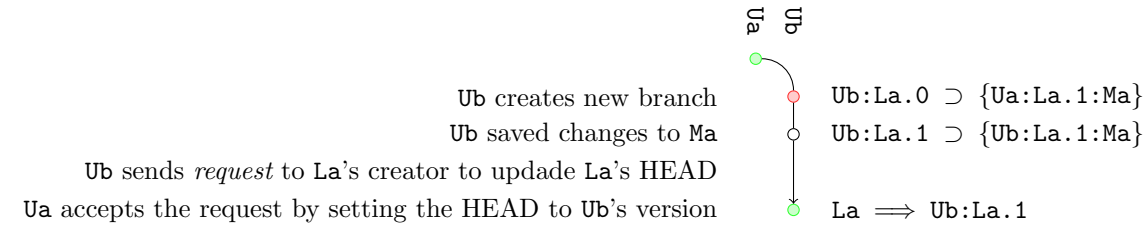
Package `La` is created by User `Ua`.
`La`'s HEAD is PackageRevision identified as `Ua:La.1`
It contains only one module - `Ma`
Following steps had to happen to achieve above status:



4.2 Scenario (1 Module, 2 Users, no dependencies)

`Ua` and `Ub` are working on `La`
`Ub` modified one module

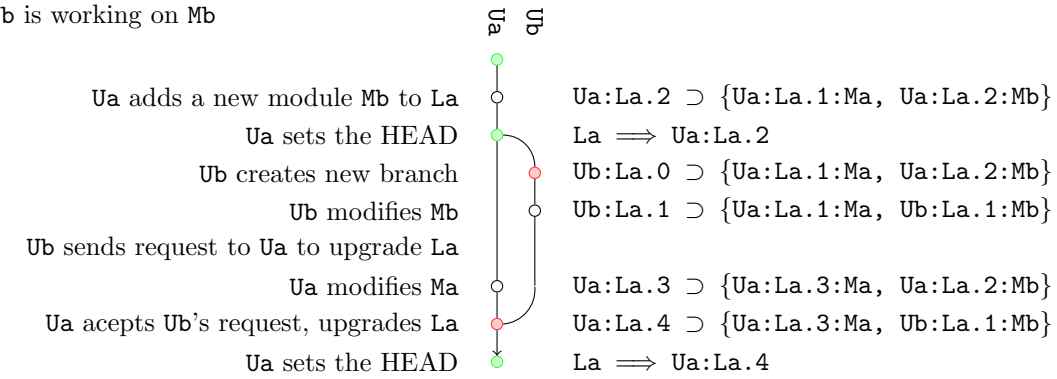
[6] FlightDeck Addon is a Jetpack extension allowing to temporary installation of the `XPI`. It needs to be called with an URL of the `XPI`.



Result: `La` ⟹ `Ub:La.1` ⊃ {`Ub:La.1:Ma`}

4.3 Scenario (2 Modules, 2 Users, no dependencies)

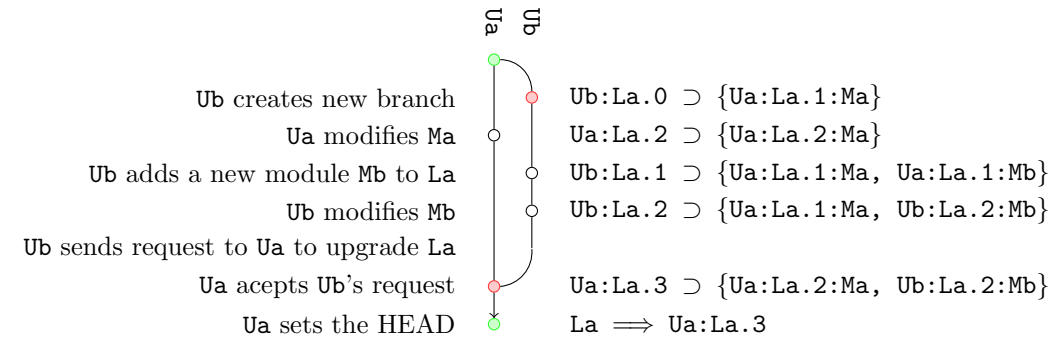
`Ua` and `Ub` are working on `La`
`Ua` created module `Mb`
`Ub` is working on `Mb`



Result: `La` ⟹ `Ua:La.4` ⊃ {`Ua:La.3:Ma, Ub:La.1:Mb`}

4.4 Scenario (2 Modules, 2 Users, no dependencies)

`Ua` and `Ub` are working on `La`
`Ub` created module `Mb`



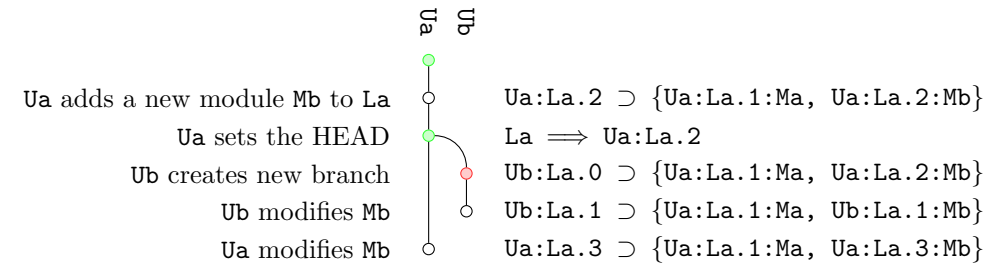
Result: `La` ⟹ `Ua:La.3` ⊃ {`Ua:La.2:Ma, Ub:La.2:Mb`}

4.5 Scenario with conflict (2 Modules, 2 Users, no dependencies)

`Ua` and `Ub` are working on `La`
`Ua` created module `Mb`

Ua and Ub are working on Mb
Conflict arises...

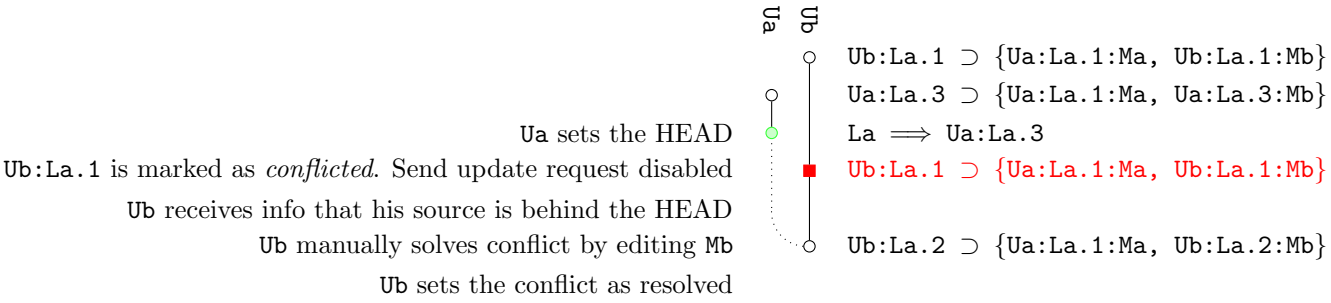
Steps leading to the conflict:



Libraries Ub:La.1 and Ua:La.3 are **conflicted** because Ub:La.1:Mb and Ua:La.3:Mb are both an evolution of the Ua:La.2:Mb. From that moment many scenarios may happen. Just a few of them will follow.

4.5.1 Ua sets HEAD and Ub's revision is outdated

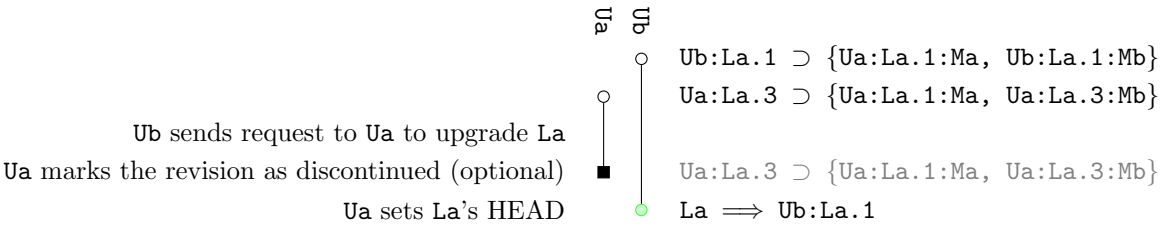
La's manager — Ua has chosen the HEAD. At that moment he doesn't know about Ub's changes to Mb.



From that moment Ub:La.2 becomes a normal (not conflicted) PackageRevision. Ub may send Package manager an upgrade request which could end by switching La's HEAD to Ub:La.2. It is important to note, that the Ub:La.2 is not an evolution of Ua:La.3, it will not be originated from it.[7]

4.5.2 Ub sends update request, Ua decides to drop his changes

Ub thinks his change to Mb is finished and requests update of the Library from its manager — Ua. He accepts the request and marks his version of this module as discontinued. This mark prevents from the automatic set to conflicted revision.



[7] Decide if this is the right thing to do.

Draft/Ideas

update Library if Library HEAD has been changed something should tell the User that an update is possible. It should then (on request) change the versions of all Modules which are not in conflict with updating Library. In essence, if
`Ua:La.1` $\supset$ {`Ua:La.1:Ma, Ub:La.2:Mb`} is a Library to be updated and
`La` $\Longrightarrow$ `Uc:La.3` $\supset$ {`Ub:La.1:Ma, Uc:La.3:Mb, Uc:La.1:Mc`} is current HEAD, then
`Ub:La.2:Mb` should be updated to `Uc:La.3:Mb` and `Uc:La.1:Mc` should be added.
User should receive a notification that `Ua:La.1:Ma` is not in sync with HEAD.

To be continued...