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Objects to Objects to Tools

Enhancing Casper with the API through Ruby

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All slides after the title slide use the "dissolve" slide transition

Chris Lasell
Apple Peeler
Pixar Animation Studios

A Long time ago

I did a JNUC session about some command-line tools we wrote that extend the Casper Suite

Primarily about

- d3, our package deployment & patch management system, which includes
- puppytime to entertain users during a logout-install,

and

- d3admin which provides manual or scriptable deployment of packages, even directly from XCode

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JNUC 2012

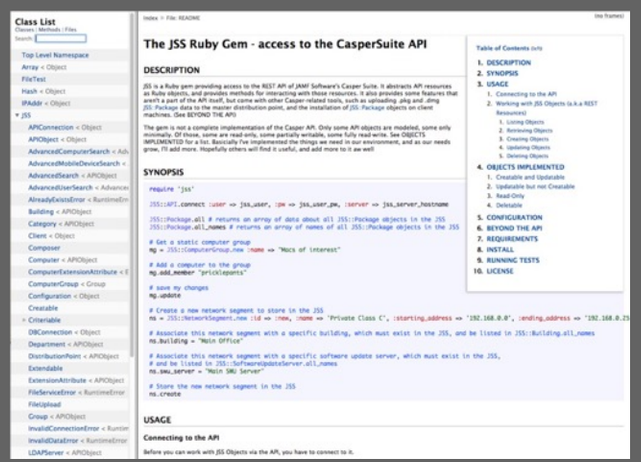
"Is it open sourced?"

-Rich Trouton

JNUC 2014

"Yes!"

-Pixar



The biggest question after that talk •

- Is it open sourced?

Two years later,

- I was happy to say that Yes it has been, partially, open sourced

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The JSS Ruby module

- Overview
- Working with objects

d3

- Overview
- Packages
- Client
- Admin

A little over a year ago we released the jss-api gem

- provides a Ruby module that makes interacting with the API much simpler

- That module is the foundation of d3

Within the next few months we'll be releasing d3 itself as a part of that project.

- Today I'm going to chat a bit about the ruby module,
- and give you a preview of d3.

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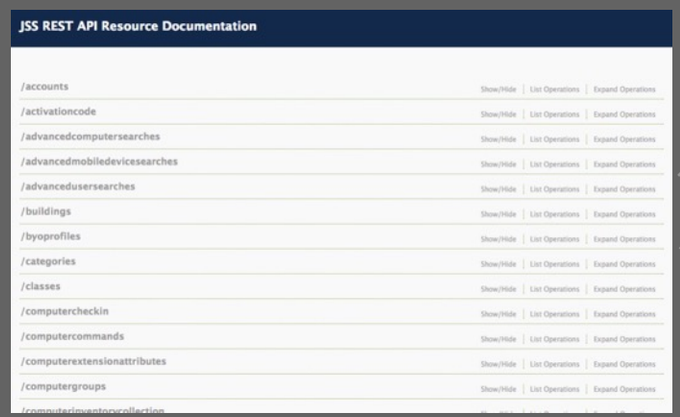
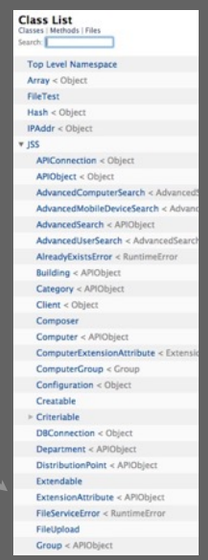
JSS Module Overview

Lets take a look at using the JSS API with ruby

It’s all about the objects





The Casper REST API provides a way to interact with many kinds of objects stored in the JSS

- The JSS Ruby module abstracts some of those objects as Ruby classes.

The Ruby objects have many easy-to-use methods for manipulating the API objects

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Which Objects?

Create, Read, Update, Delete:

- AdvancedComputerSearch
- AdvancedMobileDeviceSearch
- AdvancedUserSearch
- Building
- Category
- ComputerExtensionAttribute
- ComputerGroup
- Department
- MobileDeviceExtensionAttribute
- MobileDeviceGroup
- NetworkSegment
- Package
- Peripheral
- PeripheralType
- RemovableMacAddress
- Script
- User
- UserExtensionAttribute
- UserGroup

Read, Delete:

- DistributionPoint
- LDAPServer
- NetBootServer
- SoftwareUpdateServer

Read, Update, Delete:

- Computer
  - name
  - barcodes
  - asset tag
  - ip address
  - location data
  - purchasing data
  - editable extension attributes
- MobileDevice
  - asset tag
  - location data
  - purchasing data
  - editable extension attributes
- Policy
  - scope
  - name
  - enabled
  - category
  - triggers
  - file actions
  - process actions

So far the Ruby module implements about half of the API objects, to varying degrees

Why not all the objects, fully implemented? Mostly because of time
- I'm the only developer, the API is large, and Pixar doesn't need access to everything in there.

- Create, Read, Update & Delete
- Read, Update & Delete
- Read & Delete

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Non-API classes

APIConnection

An object representing the REST connection

Configuration

Stored settings for the connection

Server

Info about the JSS at the other end of the connection

Client

JAMF-related items on the local machine.

Composer (Module)

For creating simple .pkg and .dmg installers from a pre-made ‘root’ folder.

There are a few things in the Module that don't reflect API objects directly, but have other uses.

- APIConnection object

- contains server addresses, authentication credentials, timeouts
- methods for connecting, disconnecting, examining.

- Configuration object

- for working with system-wide and user-specific config files

- Server object

- represents the JSS you're connected to through the APIConnection

- Client

- represents the Casper-managed machine on which the code is running

- Composer

- for building simple .pkg and .dmg packages.

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Synchronicity

Extending the API by making objects work together...

Package + DistributionPoint + NetworkSegment + Client = Package.install

Script + Client = Script.run

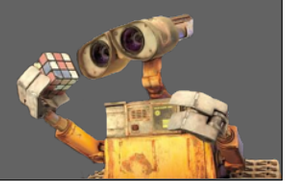
ExtensionAttribute + AdvancedSearch + Computer = Better Ext.Attr. Reporting

Objects that refer to other objects can check for existence = data consistency

The API provides access to data about JSS objects,
but once we get them into a unified
programming environment,
those objects can work together
to make something even more powerful.

- Install packages from the correct dist.point. for the current net seg. or building
- Run scripts
- Generate reports on ExtAttr values by creating on-the-fly AdvancedSearchs as needed
- ensure data consistency before getting API errors

Working with objects



So lets take a look at how to use API objects this way.

The examples I'll show you are captured from an "IRB" session,

which is like a shell where you can type ruby code

just like you can type bash code in a bash shell.

You'll see how easy it is to manipulate API objects without
ever seeing any XML.

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Installing

In a terminal: gem install jss-api

Downloads from rubygems.org

```
root@kimchi ~: gem install jss-qpi
```

Automatically installs other gem dependencies

rest-client

plist

net-ldap

Like all gems, JSS module is easy to install..

- gem install jss

- installs dependencies as needed

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Connecting to the API

Require the Gem

```
1:> require 'jss-api'
 => true
```

JSS::API.connect

Specify all options, or...

```
2:> JSS::API.connect(
:server => 'myjss.myorg.org',
:user => 'jssadmin',
:pw => 'jssadmpass',
:verify_cert => false
)
 => true
```

Options stored in JSS::CONFIG will be used automatically

```
3:> JSS::API.connect :pw => 'jssadmpass'
 => true
```

Passwords can be provided, piped through stdin, or prompted.

```
4:> JSS::API.connect :pw => :prompt
Enter the password for JSS user 'jssadmin':
 => true
```

**** USE POINTER**

Once installed, fire up IRB or open your favorite editor

- require the gem, which loads the module
- API.connect, specify all options
- or use Config and just the passwd
- or :prompt or :stdin

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Listing Objects

JSS::*APIObject*.all

JSS::*APIObject*.all_*identifier*

JSS::*APIObject*.map_all_ids_to

```
4:> JSS::MobileDevice.all
=> [{:name=>"greyhearts",
    :id=>330,
    :serial_number=>"Cgggggggg9V"},
    {:name=>"tipple",
    :id=>343,  ...
```

```
5:> JSS::Computer.all_names
=> ["rowdy",
    "takeoff",
    "lights",
    "windward",
    "trifecta"  ...
```

```
6:> JSS::Policy.map_all_ids_to :name
=> {465=>"conf.metro-pixarification",
    693=>"Firefox ESR",
    627=>"Pilot-pixelmator",
    523=>"login.hive",   ...
```

**** USE POINTER**

- APIObject.all

- An Array of Hashes for each object
- The JSON response of the API list resource

- APIObject.all_identifiers - all_names, all_ids, all_macaddresses, etc

- APIObject.map_all_ids_to   :name, :serialnumber, etc...

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Retrieving Objects

JSS::*APIObject*.new

:id => *Integer*

-or-

:name => *String*

Attributes as methods

Simple

Complex

```
7:> a_comp = JSS::Computer.new :name => "kimchi"
  => #<JSS::Computer:0x10763bc50>
```

```
8:> a_comp.serial_number
  => "W80336UK2A5GV"

9:> a_comp.last_contact_time
  => Thu Aug 28 12:23:03 -0700 2014
```

```
10:> a_comp.hardware[:processor_type]
  => "Intel Core i5"
```

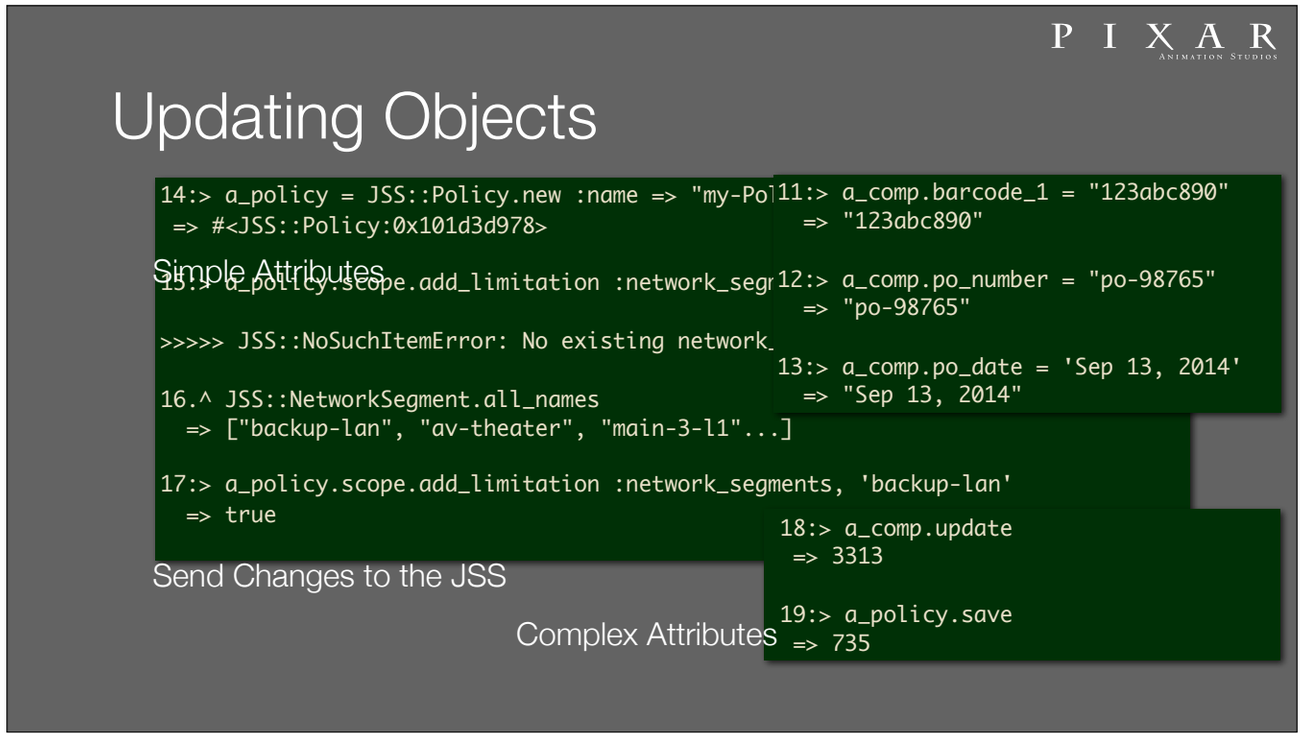
**** USE POINTER**

- Objects are retrieved by creating a Ruby instance with the :id or :name of a JSS object.

Sometimes by other identifiers, eg Computers by :id, :name, :serialnumber, :macaddress, :udid

- Attributes from the API are available via method calls, usually with the same name.

All objects have #id and #name methods. Other vary depending on the object.



**** USE POINTER**

- Change the value of a simple attribute with =
- Some attributes are more complex, like scope, which is a Scope object. - errors can be raised
- Save is an alias of update

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Creating Objects

JSS::*APIObject*.new :id => :new, :name => '*a_name*'

```
20:> new_pkg = JSS::Package.new :id => :new, :name => "filemaker13.pkg"
 => #<JSS::Package:0x101d3d978>

21:> new_pkg.in_jss?
 => false
```

Add attribute data

```
22.> new_pkg.category = 'Useful Software'
  => true

23:> new_pkg.os_limitations = '>=10.6.x'
  => true
```

Create it in the JSS

```
24.> new_pkg.create  # Also new_pkg.save
  => 573
```

**** USE POINTER**

- :id => :new, need at least a :name.

Some classes require more than just :name when creating
 e.g. Groups require :type as either :smart or :static

- This doesn't create anything in the JSS, just gives you a Ruby object to work with..
- Save is also an alias for create

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Deleting Objects

All API objects can be deleted

Call #delete on an object

- Happens immediately!
- Be Careful!

One-liner

```
25:> my_dead_cat = JSS::Category.new :name => 'my category'
 => #< Category:0x001d3d578>

26:> my_dead_cat.delete
 => true
```

```
27.> JSS::Category.new(:name => 'my category').delete
 => true
```

**** USE POINTER**

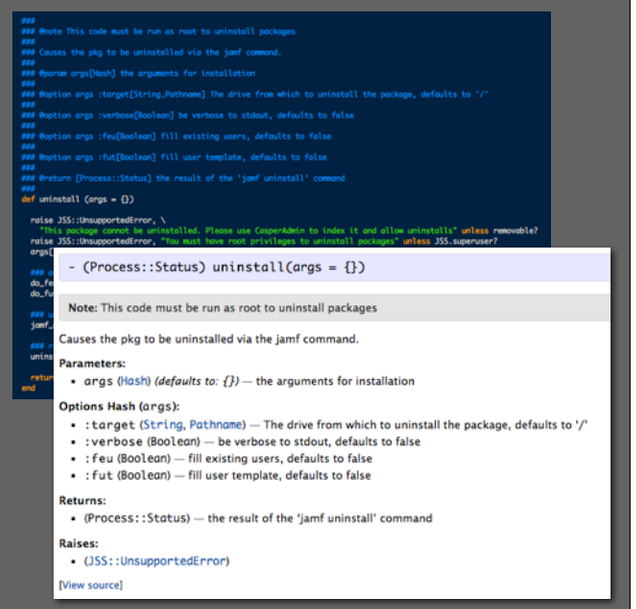
- All API objects can be deleted
- retrieve any object, and you can call its delete method
- Ruby lets you retrieve and delete in one step.

Documentation

Heavily documented source

YARD-generated html

http://www.rubydoc.info/gems/jss-api

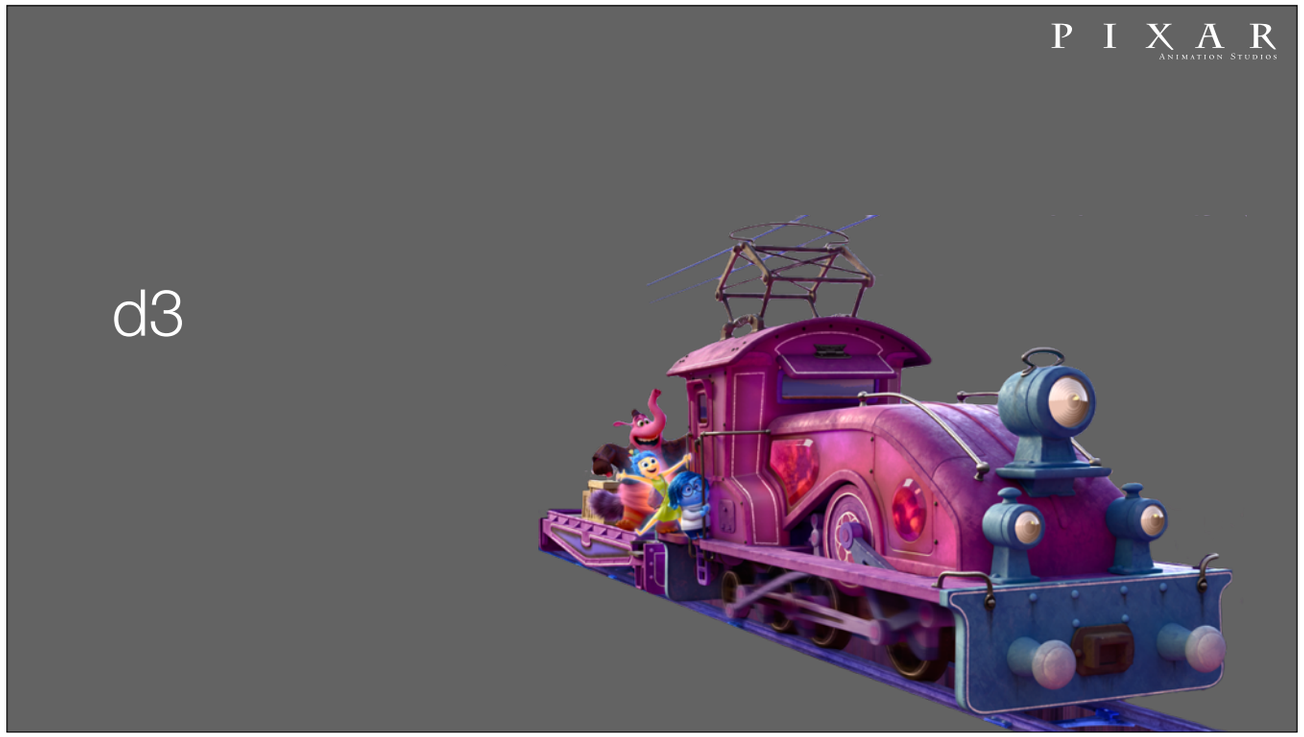


The things I've shown so far are just the tip of the iceberg.

To really use the Module you'll have to start looking at the documentation.

And if you'd like to modify (and hopefully contribute to) the code, the docs are *VERY* important

- The source code is heavily documented.
- The reason for the extensively formatted comments ...auto-generated YARD HTML docs



So there are the basics of using Ruby to access the JSS API

There are a couple sample programs included with the gem to show how to use it for practical purposes.

The main reason it was created, however, is for d3.

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What's d3?

A Package & Patch management tool for Casper

- Sort-of "munki for Casper", but entirely command-line
- Extends the capilities of Casper's package management
- Mostly a client 'd3' and admin tool 'd3admin'
- Utilizes Casper scripts and policies for customization
- Stands for 'depot 3'

Whats D3?

- A Patch Management tool for casper packages.

(read the slide)
Sort-of "munki for Casper", but entirely command-line
Extends the capilities of Casper's package management
Mostly a client 'd3' and admin tool 'd3admin'
Utilizes Casper scripts and policies for customization
Stands for 'depot 3'

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d3 Packages

Casper Packages that now...

- Know they are different versions of the same thing
- Auto-update on clients when new version is released
- Conditional (un)install based on pre- script status
- Quick and easy manipulation from a shell
- Auto uninstall if unused after some days

Packages in d3 are just Casper packages

- but they're smarter.

(read the slide)
Know they are different versions of the same thing
Auto-update on clients when new version is released
Conditional (un)install based on pre- script status
Quick and easy manipulation from a shell
Auto uninstall if unused after some days

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d3 client

In a terminal: d3 *options command arguments....*

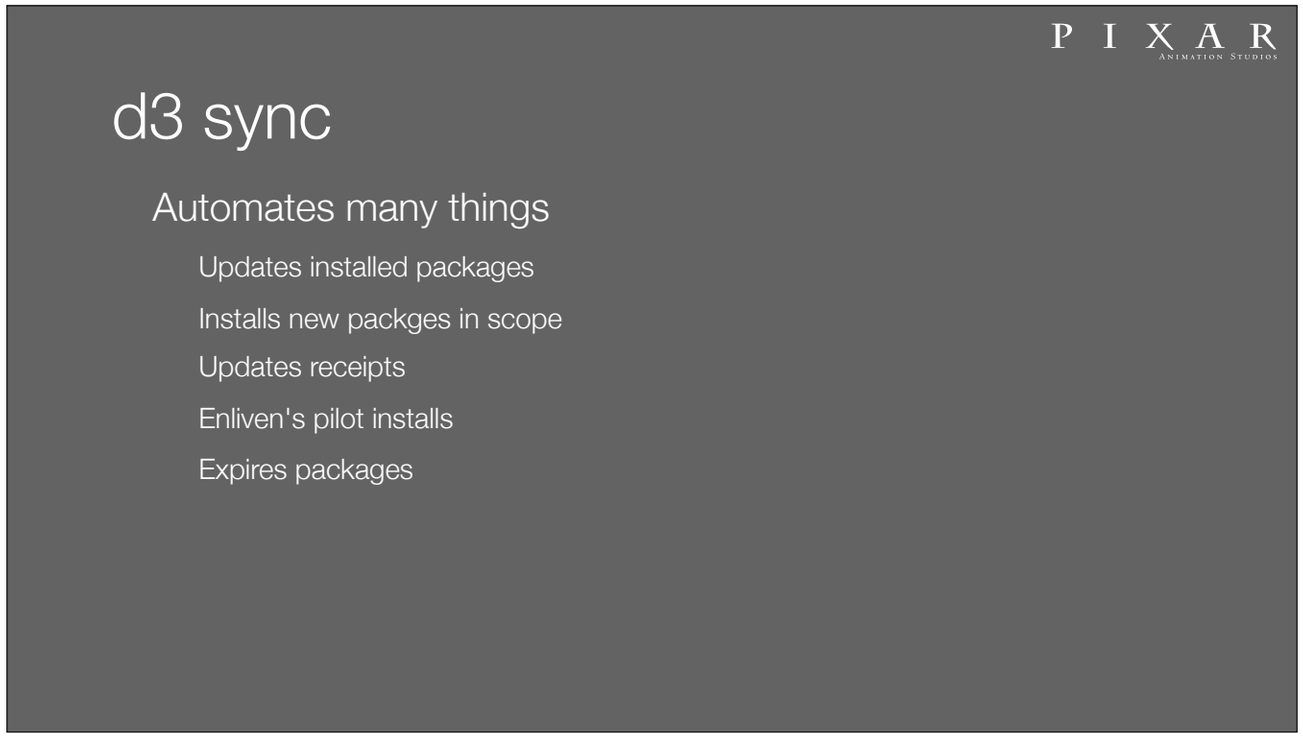
- Install/Uninstall packages
- Pilot packages
- Get lists of many kinds
- Sync
- Puppytime!

```
root@kimchi ~: d3 install filemaker
root@kimchi ~: d3 pilot filemaker-13-3
root@kimchi ~: d3 list-installed
root@kimchi ~: d3 list-available
root@kimchi ~: d3 list-files
root@kimchi ~: d3 sync
```

- The d3 client is a shell command called 'd3' which takes many subcommands.

It can...

(read slide)
Install/Uninstall packages
Pilot packages
Get lists of many kinds
Sync
Puppytime!



Syncing is the heart of d3's automation.

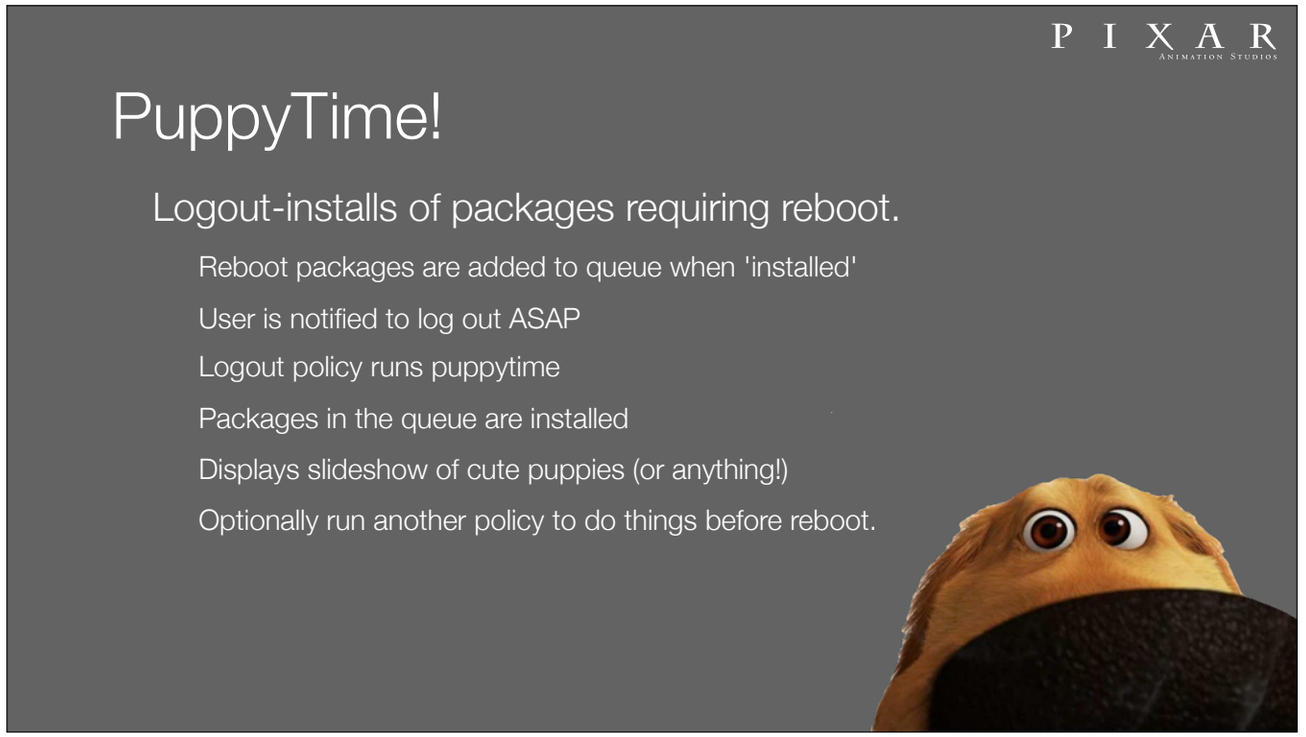
- When the sync command is given,

(read slide)

Updates installed packages
Installs new packges in scope
Updates receipts
Enliven's pilot installs
Expires packages

Syncing should be done multiple times a day - we use a LaunchDaemon to do it every 6 hours

But it can be done manually whenever a machine needs to get caught up



When d3 installs a package that requires a reboot,

- it doesn't install it, but instead adds it to a queue of packages awaiting logout.

(read slide)
Reboot packages are added to queue when installed
User is notified to log out ASAP
Logout policy runs puppytime
Packages in the queue are installed
Displays slideshow of cute puppies (or anything!)
Optionally run another policy to do things before reboot.

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d3admin

In a terminal: d3admin *command options...*

- Add packages to d3 and Casper, building them if needed
- Configure package settings
- Make packages "live" after piloting them (i.e. release them)
- Walk-thru prompting, or provide all options on the command line
- Scriptable, integrates with XCode
- Client reports - installs, pilots, deprecated installs
- Archive packages and metadata

d3admin is the tool for adding & editing packages in d3.

You can think of it as a combination of Casper Admin and Composer,
but its all CommandLine.

- Use it to

(read slide)
Add packages to d3 and Casper, building them if needed
Configure package settings
Make packages "live" after piloting them (i.e. release them)
Walk-thru prompting, or provide all options on the command line
Scriptable, integrates with XCode
Client reports - installs, pilots, deprecated installs
Archive packages and metadata

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Open Source

Home pages

http://pixaranimationstudios.github.io/jss-api-gem

http://pixaranimationstudios.github.io/depot3 (Coming Soon)

Email

jss-api-gem@pixar.com

d3@pixar.com

Slack MacAdmins

#jss-api

@glenfarclas17

There's a brief overview of the JSS module and d3.

The Module is already available via github and rubygems.org

A very alpha version of d3 will be up there before summer.

- I still have to write initial documentation and an installer.

- it requires a fair bit of setup in your JSS - some day an installer will walk you through that.

Q & A

Go back to prev. slide.