oVirt

UI Plugins

Feature & implementation overview

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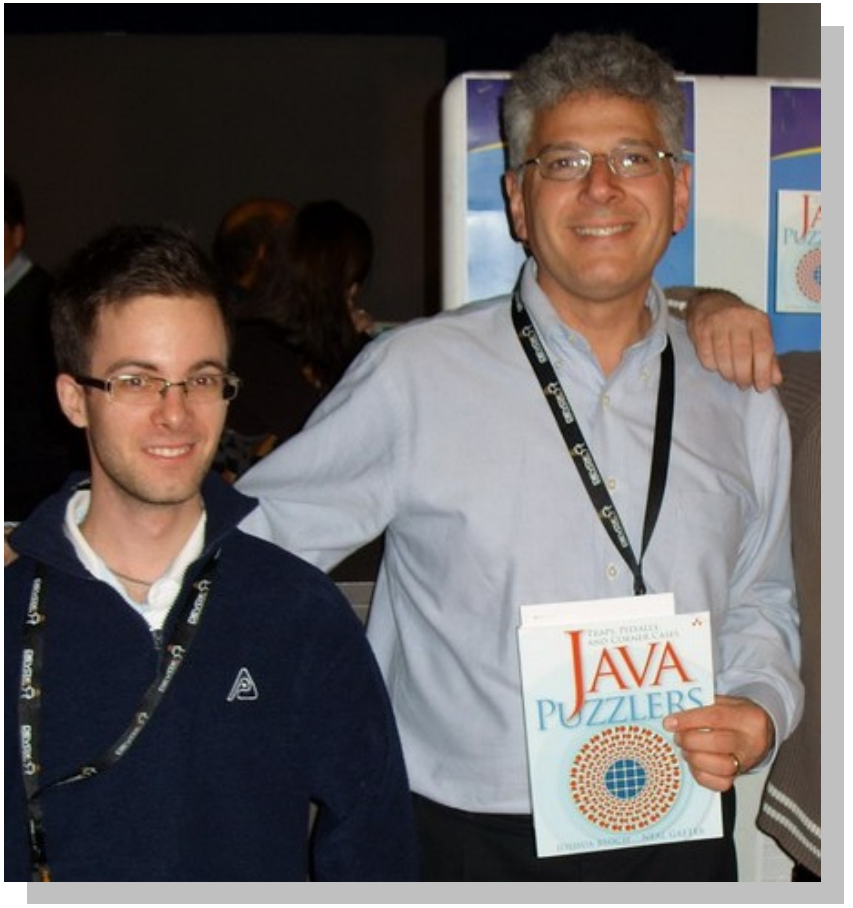
About the speaker

- oVirt / RHEV UI maintainer
- Member of UX team, maintaining Frontend application architecture and infrastructure
- Lead developer of UI Plugins feature



Topics covered in this session

- Feature overview
- Current state of plugin infrastructure
- Tutorial on writing simple plugin
- Tips for implementing new plugin features

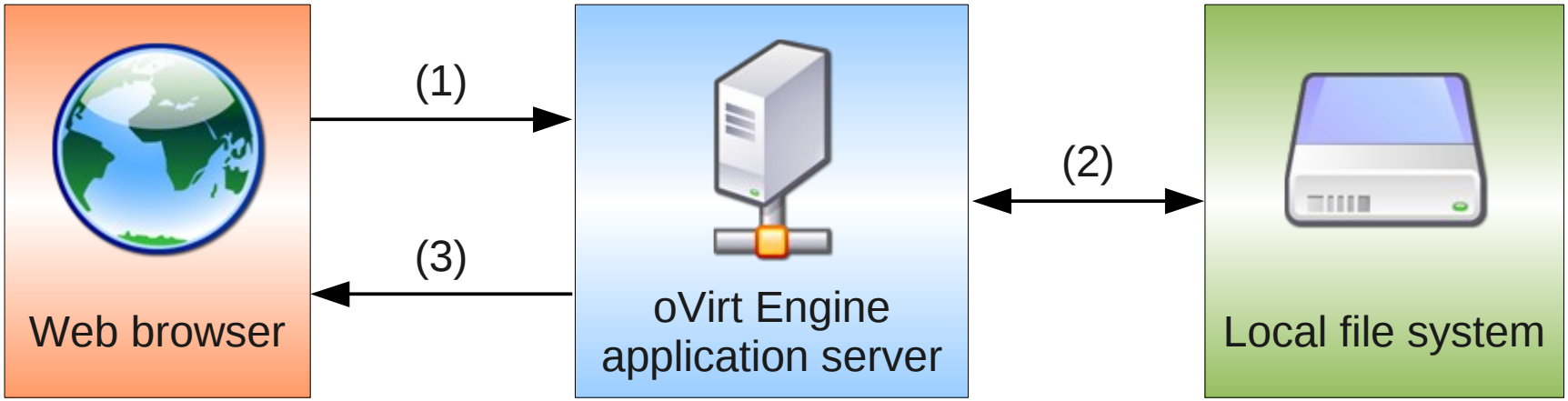
Feature overview

- Extend or customize oVirt Engine functionality through WebAdmin user interface
- Plugins can be packaged and distributed for use with oVirt Engine
- Planned oVirt feature, currently in proof-of-concept development stage
- Updates and announcements on engine-devel list

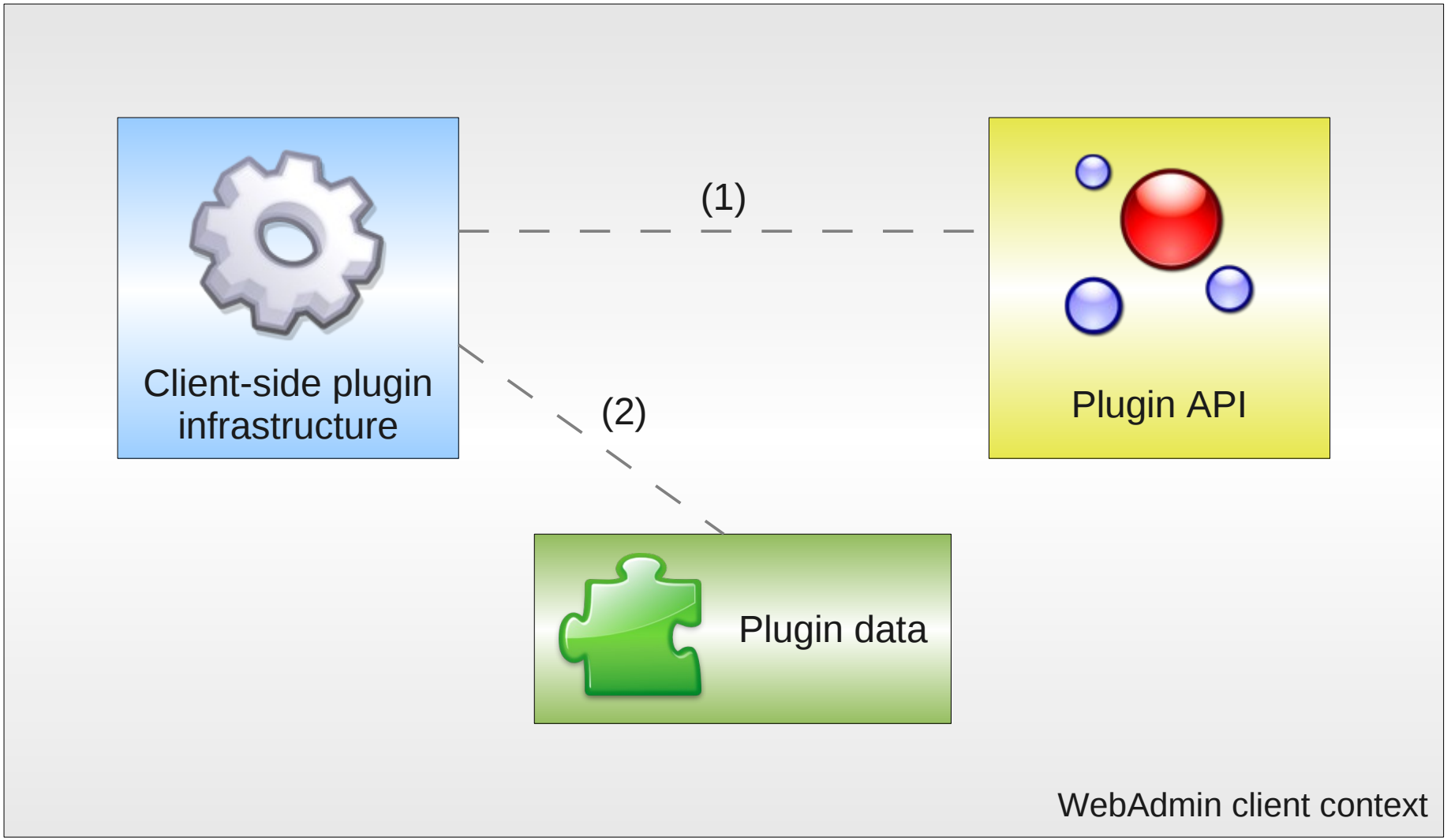
Technical background

- Plugins integrate with WebAdmin on client using JavaScript programming language
- Simple and flexible plugin infrastructure
  - WebAdmin exposes plugin API
  - Plugins consume the API
  - WebAdmin calls (invokes) plugins at key events during the application runtime

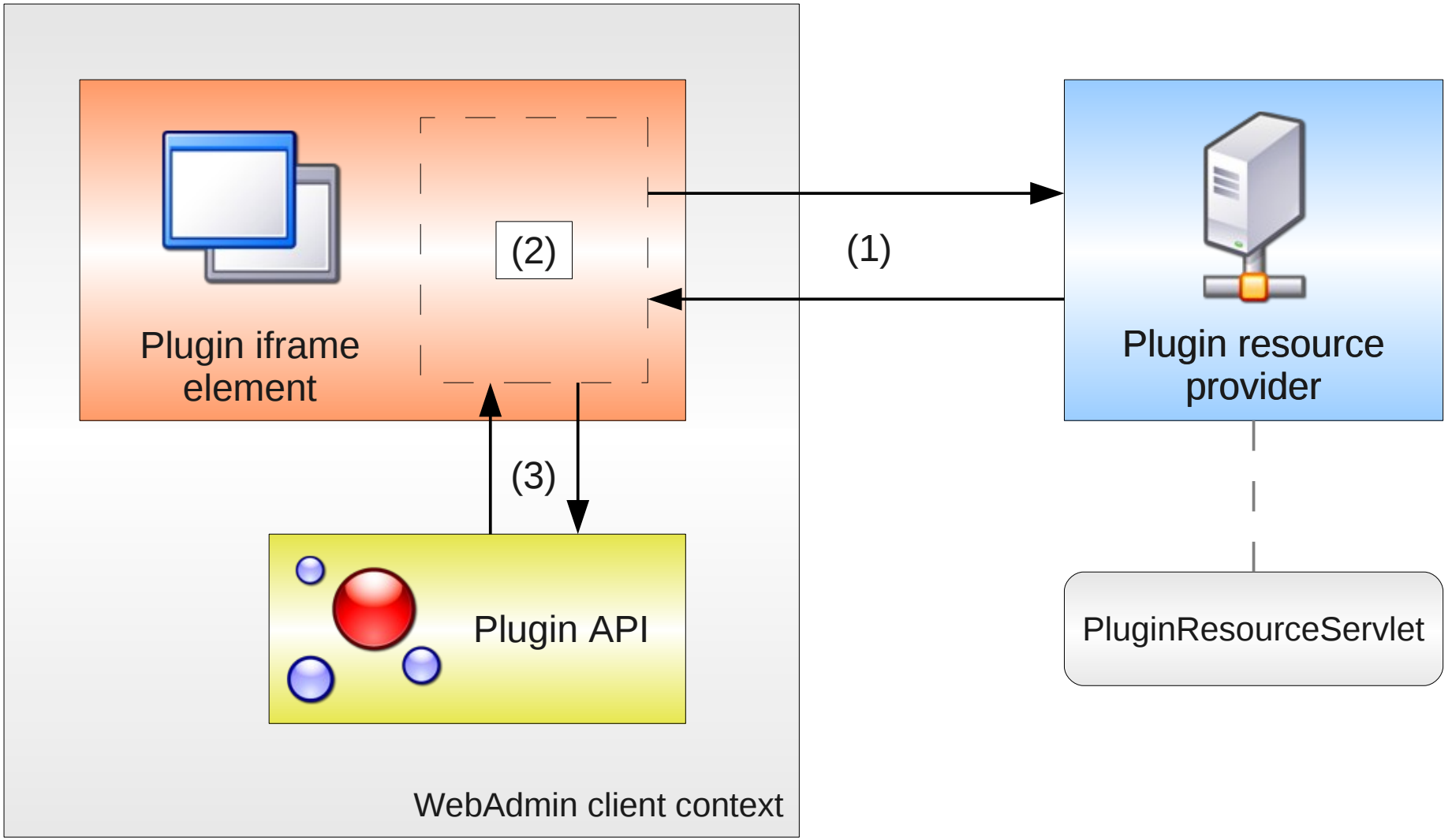
How it works, part 1



How it works, part 2



How it works, part 3



Plugin host page example, part 1


```
<!DOCTYPE html>
<html>
<head>
    <!-- Fetch additional resources if necessary -->
    <script type="text/javascript" src="jquery-min.js"></script>

    <!-- Actual plugin code -->
    <script>









    </script>

</head>
<body> <!-- HTML body is intentionally empty --> </body>
</html>
```

Plugin host page example, part 2

```
<!DOCTYPE html>
<html>
<head>
    <!-- Fetch additional resources if necessary -->
    <script type="text/javascript" src="jquery-min.js"></script>

    <!-- Actual plugin code -->
    <script>
        // Access plugin API from iframe context
        var api = parent.pluginApi('foo');

        // Register plugin event handler functions
        api.register({
            UiInit: function() {
                api.addMainTab('Foo Tab', 'foo-tab', 'http://foo.com/');
            }
        });

        // Tell plugin infrastructure that we are ready
        api.ready();
    </script>

</head>
<body> <!-- HTML body is intentionally empty --> </body>
</html>
```

Design implications, part 1

- JavaScript allows dynamic behavior in plugins

Design implications, part 2

- JavaScript allows dynamic behavior in plugins
- WebAdmin vs. plugin integration happens directly on the client

Design implications, part 3

- JavaScript allows dynamic behavior in plugins
- WebAdmin vs. plugin integration happens directly on the client
- Using iframe as plugin execution sandbox

Design implications, part 4

- JavaScript allows dynamic behavior in plugins
- WebAdmin vs. plugin integration happens directly on the client
- Using iframe as plugin execution sandbox
- WebAdmin vs. plugin communication is subject to Same-Origin Policy

```
http://my.domain/doc.html
https://other.domain/doc.html
```

Current state of plugin infrastructure

- Core infrastructure pretty much complete (rev.5)
- Focus on specific plugin API features (rev.6)
  - Custom content shown in main / sub tabs
  - Data grid context-sensitive buttons / menu items

Infrastructure explained, part 1

- Plugin descriptor (JSON)

  `/usr/share/engine/ui-plugins/foo.json`

```
{

    // A name that uniquely identifies the plugin (required)
    "name": "foo",

    // URL of plugin host page that invokes the plugin code (required)
    "url": "/webadmin/webadmin/plugin/foo/start.html",

    // Default configuration object associated with the plugin (optional)
    "config": { "band": "ZZ Top", "classic": true, "score": 10 },

    // Path to plugin static resources (optional)
    // Used when serving plugin files through PluginResourceServlet
    // This path is relative to /usr/share/ovirt-engine/ui-plugins
    "resourcePath": "foo-files"

}
```

Infrastructure explained, part 2

- Plugin configuration (JSON)

  `/etc/engine/ui-plugins/foo-config.json`

```
{

    // Custom configuration object associated with the plugin (optional)
    // This overrides the default plugin descriptor configuration, if any
    "config": { "band": "AC/DC" },

    // Whether the plugin should be loaded on WebAdmin startup (optional)
    // Default value is 'true'
    "enabled": true,

    // Relative order in which the plugin will be loaded (optional)
    // Default value is Integer.MAX_VALUE (lowest order)
    "order": 0

}
```

Infrastructure explained, part 3

- Merged plugin configuration (JSON)

```
{ "band": "ZZ Top", "classic": true, "score": 10 }
```

+

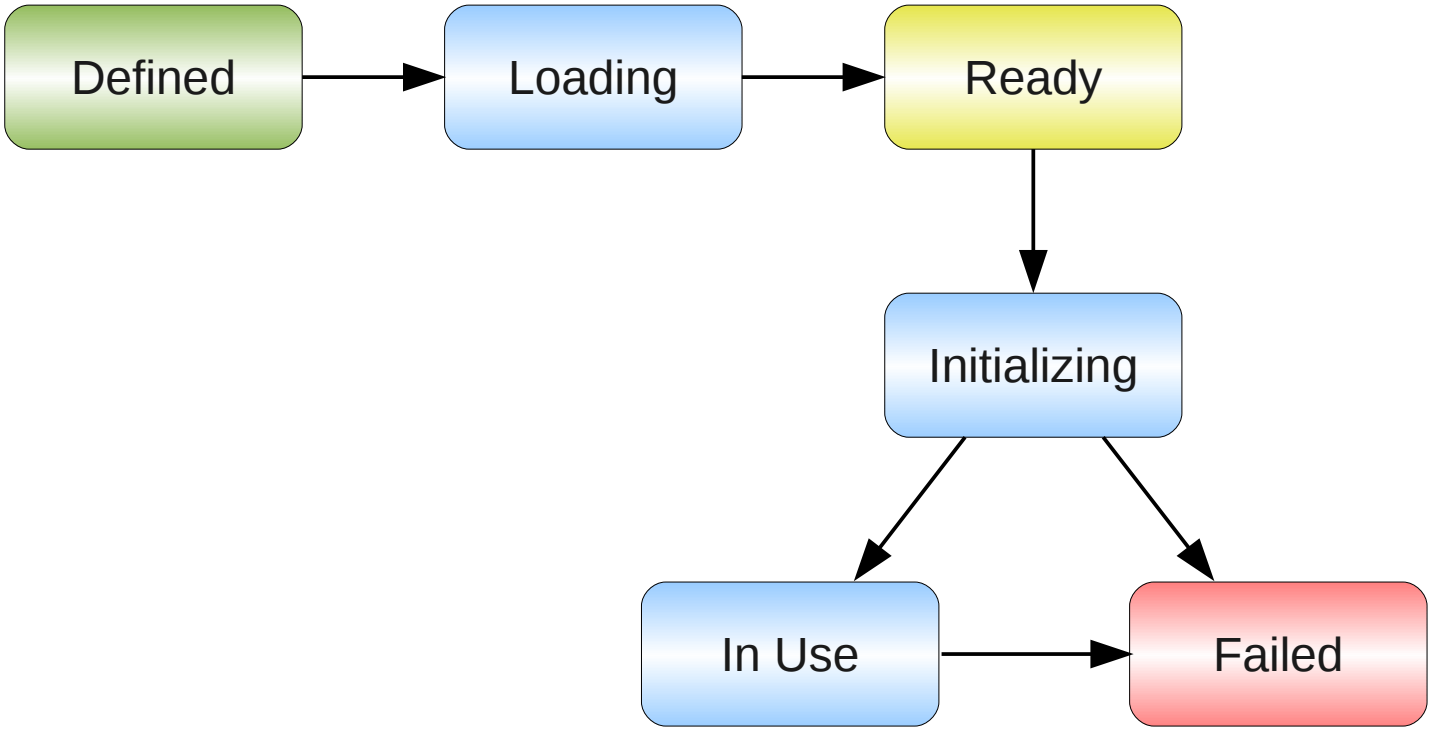
```
{ "band": "AC/DC" }
```

=

```
{ "band": "AC/DC", "classic": true, "score": 10 }
```

Infrastructure explained, part 4

- Plugin lifecycle (client-side)



Tutorial: writing simple plugin

(1) Write plugin descriptor

(2) Write plugin host page

(3) Show plugin in action

Tip: new plugin API function, part 1

- Add new function in PluginManager.exposePluginApi

```
// GWT JSNI method that creates and exposes global plugin API object
private native void exposePluginApi() /*-{

    ...

    // Add new function to pluginApi prototype
    pluginApi.fn = pluginApi.prototype = {

        myFunction: function() {
            // Don't forget to validate plugin action
            if (canDoPluginAction(this.pluginName)) {
                // Delegate to Java method through GWT JSNI
                uiFunctions.@org...PluginUiFunctions::myMethod()();
            }
        }

    };

    ...

}-*/;
```

Tip: new plugin API function, part 2

- Add new method in target Java class

```
package org.ovirt.engine.ui.webadmin.plugin;

// Implements UI related functionality exposed to plugins
public class PluginUiFunctions {

    ...

    public void myMethod() {
        // Plugin API function implementation
    }

    ...

}
```

Tip: new application event, part 1

- Create new event using @GenEvent

```
package org.ovirt.engine.ui.webadmin.plugin.event;

@GenEvent
public class HostActivated {

    List<VDS> hosts;

}
```

Tip: new application event, part 2

- Use EventBus to fire event within WebAdmin code

```
public class MainTabHostView ... {

    void initTable() {

        getTable().addActionButton(
            new WebAdminButtonDefinition<VDS>(constants.activateHost()) {
                @Override
                protected UICommand resolveCommand() {
                    return getMainModel().getActivateCommand();
                }

                @Override
                public void onClick(List<VDS> selectedItems) {
                    // Execute default (Activate) command logic
                    super.onClick(selectedItems);

                    // Fire event through the EventBus
                    HostActivatedEvent.fire(eventBus, selectedItems);
                }
        });

    }

}
```

Tip: new application event, part 3

- Handle event in PluginEventHandler constructor

```
@Inject
public PluginEventHandler(EventBus eventBus, final PluginManager manager) {

    // Add HostActivatedEvent handler
    eventBus.addHandler(HostActivatedEvent.getType(),
        new HostActivatedHandler() {

            @Override
            public void onHostActivated(HostActivatedEvent event) {
                // Optional context object, could carry
                // data about hosts that were activated
                JavaScriptObject contextObject = null;

                // Use PluginManager to invoke specific event handler
                // function on all plugins which are currently in use
                manager.invokePlugins("HostActivated", contextObject);
            }

        });

}
```

Future plans

- Implement more plugin features (API, events)
- Update oVirt wiki page

  http://www.ovirt.org/wiki/Features/UIPlugins
- Transition out of proof-of-concept stage

Thank you!

http://www.ovirt.org/

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