

Fractal and management

What could be done in Fractal related
to application management ?

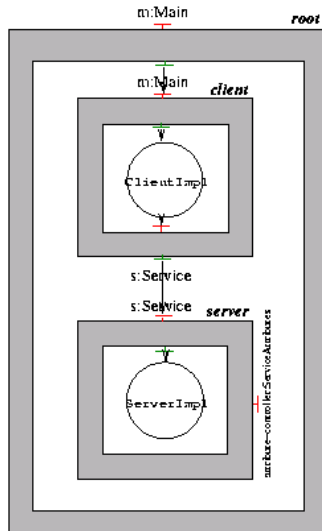
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Remark: please... Excuse my french :-)

1st ideas and example

- Instrumentation/monitoring
 - configuration: some real work is done somewhere else.
 - "applications are the resources"... ?
- Provide easy link with "legacy" administration *frameworks*...
 - Jmx: main target ?
 - for Ow project refactoring stuff using fractal.
 - I.e j2ee JSR
- Stay as much as possible at Fractal level
 - ⇒ use assembly time to introduce "instrumentation" of functional components

HelloWorld



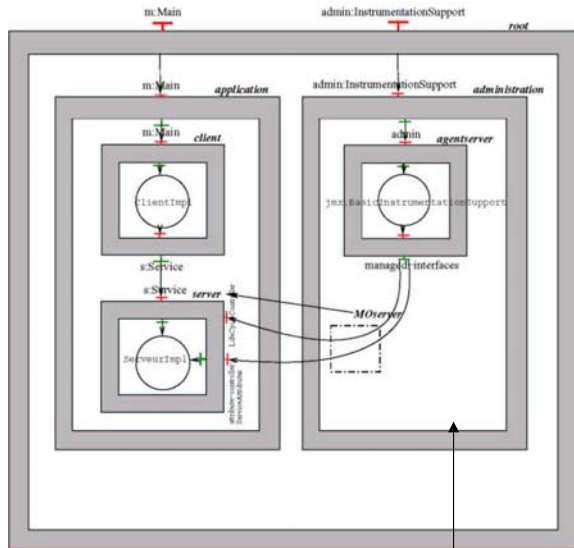
```
<primitive-component name="client">
  <provides>
    <interface name="m" type="Main"/>
  </provides>
  <requires>
    <interface name="s" type="Service"/>
  </requires>
  <class name="ClientImpl"/>
</primitive-component>
<primitive-component name="server">
  <provides>
    <interface name="s" type="Service"/>
    <b>interface name="attribute-controller"
      type="ServiceAttributes"/>
  </provides>
  <requires/>
  <class name="ServerImpl"/>
  <attributes>
    <attribute name="Header" value="-> "/>
    <attribute name="Count" value="1"/>
  </attributes>
</primitive-component>
</subcomponents>
<bindings>
  <binding client="application.m" server="client.m"/>
  <binding client="client.s" server="server.s"/>
</bindings>
```

Rmk: default controller interfaces are not depicted (Lifecycle,)

This is the "traditional" hello world example, in Fractal. Let's say we want to expose via JMX the attributes of server's "attribute-controller" interface (in bold).

Note: we could say that those components (root, client, server...) are the functional part of this example.

HelloWorld + jmx access



- fractal service instances, associated to a name (jmx) are exposed
- a fractal component does the exposition (*agentserver*)
- bindings between "managed-interface" and interfaces to expose
- instrumentation components are kept apart

Q: is there any nice tool to *easily* draw Fractal diagram ?

Jmx access

We just need to bind the interface to expose to the required interface "managed-interfaces" of agentserver component. In some way this "non fonctionnal" component wraps MBeanServer.

HelloWorld + JMX (2)

```
<composite-component name="administration">
  <provides>
    <interface name="admin" type="jmx.InstrumentationSupport"/>
  </provides>
  <requires/>
  <subcomponents>
    <primitive-component name="agentserver">
      <provides>
        <interface name="admin" type="jmx.InstrumentationSupport"/>
      </provides>
      <requires>
        <interface name="managed-interfaces" type="" sort="collection"/>
      </requires>
      <class name="jmx.BasicInstrumentationSupport"/>
    </primitive-component>
    <shared-component name="MOServer">
      <path value="root.application.server"/>
    </shared-component>
  </subcomponents>
  <bindings>...
  <binding client="agentserver.managed-interfaces0" server="MOServer.lifecycle-controller"/>
  <binding client="agentserver.managed-interfaces1" server="MOServer.attribute-controller"/>
  <binding client="agentserver.managed-interfaces2" server="agentserver.lifecycle-controller"/>
  <binding client="agentserver.managed-interfaces3" server="agentserver.admin"/>
  </bindings>
</composite-component>
```

This is the "administration" part of the modified HelloWorld example.

A composite ("administration") packs any components related to administration:

- "agent" ("agentserver") in charge of JMX exposition
- shared ("Moserver" : the "Managed Object" fo fonctionnal "server" component)) components to access fonctionnal components for which some interfaces would be exposed. The name of this shared component is used to build the JMX name associated to the exposed component.
- if needed: "technic administrative" component: Gauge, Counter... (not shown on this example, not implemented)

The red bindings imply exposition of "server" interfaces: attributes-controller (as wanted) and "life-controller" (life cycle management could be seen as an administrative activity).

Black bindings are for "fun": "agentserver" component exposes some of its interfaces (no shared object needed as we stay in the same composite).

Jmx Mapping

- Fractal *attributes-controller* interface -> set of JMX attributes
- Other fractal interface -> set of JMX operations
- Name...a JMX name must be provided... somehow...
 - built from name of "shared" component or *name-controller*, plus default JMX domain and key (fractal attributes of the "*agentserver*")
 - defined by user... extra xml stuff (todo).

JMX Mapping (2)

- Current test uses ModelMBean
 - lots of JMX descriptor fields are not used... How user can specify then ? Extra xml stuff for binding ? Todo.
- (Stupid) restriction: one generated ModelMBean only maps fractal interfaces from the same ComponentIdentity owner.
 - Why ? Because I am lazy...
 - Any needs to do otherwise ? Yes, management view may want to group and expose attributes in a different way than Component level.
 - This kind of special views can be specified with extra fractal Components (in the *Administration* composite), and then exposed them as previously shown...
- Problem: method name slashes. Fractal interfaces method names are flattened in the created ModelMBean scope.

OTHER OPEN QUESTION: How to introduce NOTIFICATIONS, ALARMS, common practices in supervision at the fractal level...

What next ?

- Fractalization of JMX...
 - Connectors, adaptors => configure the *agentserver*
 - JMX component like *monitors* => specify some monitoring functions at the fractal level
- Better test implementation (easy ;->)
 - un/re/binding to *management-interfaces* => update Mbeans (exposed attributes or operations, registration)
 - Gauge, counter threshold by dynamic code generation ?
- Mapping Component models... General pb...

Note: at this time (2003, january) none part of this "work" appears in fractal distribution or cvs.