Evolution of the Fractal Project
Fractal V3

Fractal Workshop
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ObjectWeb
Open Source Middleware

Fractal Ecosystem (1/2)

⇒ Yesterday
- V0 in January 2002, V1 in July 2002: Julia implementation + a few tools (RMI, GUI, ADL v0)
- V2 in September 2003: Convergence with Think, Kilim, ProActive; evolution of Fractal ADL (extensibility)

⇒ Today
- 7 execution platforms (a.k.a. implementations: focus on membrane engineering)
  - Julia reference implementation for java middleware (FT, INRIA)
  - Think framework for dedicated embedded systems in C (FT, INRIA)
  - ProActive java implementation targeting grid computing (INRIA, FT)
  - AOKell: AspectJ-based Java implementation for membrane programming (INRIA, FT)
  - Plasma C++ implementation and extensions for autonomic QoS management in multimedia applications (INRIA)
  - FractNet.NET (.NET, Java, VB.NET, Cobol.NET) implementation based on AOKell (LSR)
  - FracTalk SmallTalk implementation (EM Douai)
  - … (one in China to come!)

Fractal Ecosystem (2/2)

⇒ An interesting set of R&D activities and Tools
  - Formal models and calculi (INRIA, Verimag)
  - Configuration (Fractal ADL, Think ADL - FT, INRIA, STM), navigation/query (EMN, FT)
  - Dynamic reconfiguration (FT, INRIA)
  - Management - Fractal JMX (FT)
  - Packaging, deployment (INRIA, LSR, Valoria)
  - Security, isolation (FT)
  - Correctness: structural integrity (FT), behavioural contracts based on assertions (ConFract - I3S, FT), behavior protocols (Charles U., FT), temporal logic (Fractal TLO - FT), automata (INRIA), test (Valoria)
  - QoS management (Plasma - INRIA, Qinna - FT)
  - Self-adaptation, autonomic computing (Jade - INRIA, Safran- EMN, FT)
  - Components & aspects (FAC, Julius, AOKell - INRIA, FT)
  - Components & transactions (Jironde - INRIA)

⇒ Some operational usages
  - Jonathan, Jabyce, Dream, Perseus, Speedo, JOnAS (persistence), GoTM, CLIF…
  - Dissemination in industry (FT, STM, Nokia), universities including teaching (Grenoble, Chambéry, Nantes, …), conferences (JC, LMO, SC, Euromicro…)

Agenda

⇒ Evolution of the Fractal ecosystem
⇒ Fractal V3 specification management
⇒ Fractal code base management
⇒ Fractal community management
Fractal Specification V3 (1/4)

Technical points to discuss

- Interfaces
  - Functional vs control: no ontologic difference, a distinction may be used the usage (access rights) and the implementation (by a membrane or not)

- Bindings
  - Semantics of communications (synchronous/asynchronous, unicast/multicast/gathercast)
  - Semantics of bind/unbind wrt bindings and components creation/destruction

- Containment
  - « Peer-to-peer » bindings: « system composites » are not mandatory
  - Semantics of add/remove wrt components creation/destruction

- Structure of membranes
  - Interceptors in membranes specified by the model?
  - Components in membranes specified?
    - A priori no: the model is agnostic wrt membrane programming

- Semantics of sharing
  - Which component is actually responsible for the management of a shared component -> notion of « ownership »?

Fractal Specification V3 (2/4)

Technical points to discuss (cont)

- Memory management
  - Need for explicit component destruction operation (cf. bindings, containment, mapping to languages without GC)?

- State management for reconfiguration
  - Can we go beyond (get,set)State?

- Activity/behaviour/execution model

- Type system(s)
  - Syntactic (current), structural & behavioural contracts
  - Mutable vs immutable types?

- Remove « Adherence » to Java in APIs (e.g. Fc suffix, memory management)

Fractal Specification V3 (3/4)

Organization of the specification (proposition)

- Core
  - Current controllers for (re)configuration: bindings, containment, lifecycle + state (?)
  - “Library of controllers” (?)
  - “Most useful controllers” (?)
  - “Membrane typology” (primitive, parametricPrimitive, etc.)?

Fractal Specification V3 (4/4)

Organization of work on specification (proposition)

- Editing structure
  - Editors
    - T. Coupaye (France Telecom)
    - J.-B. Stefani (INRIA)
  - Editing committee (To be finalized)
    - D. Caromel (INRIA)
    - T. Coupaye (France Telecom)
    - T. Ledoux (EMN)
    - P. Merle (INRIA)
    - L. Seinturier (INRIA)
    - J.-B. Stefani (INRIA)
  - Contributors
    - Anybody (discussions on mailing-list)

- Organization of work
  - Sub-groups?
  - Integration of contributions
Fractal Code Base Management

- Cartography/matrix implementations/tools
  - Can I use Fractal Explorer with AOKell?
  - Can I use Fractal JMX and ConFract with ProActive?
  - Can I use Fractal ADL with Think? With FractNet?

- Mix of controllers from distinct implementations
  - Toward an (ADL-based) retargetable configuration chain

- (Conformance) test suites

- Demonstration platforms (?)

- Maintenance of the code bases(s)?
  - Versions dependencies (Julia, ASM, AspectJ...)

Fractal Community Management

- Fractal on ObjectWeb web site
  - More visibility to implementations, extensions, tools, reports, tutorials, bibliography, etc.
  - More visibility for usage/success stories
    - Jonathan, DREAM, CLIF, Speedo, Perseus, GoTM, Jabyce
  - Webmaster(team)

- Fractal workshop 2006+ proposition
  - More structured event (proceedings)
  - Standalone event in summer 2006 or ECOOP tutorial/workshop
  - Satellite of OBJECTWEBCON or other event in 2007