some title

Robert Boczek   Dawid Ciepliński

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Outline

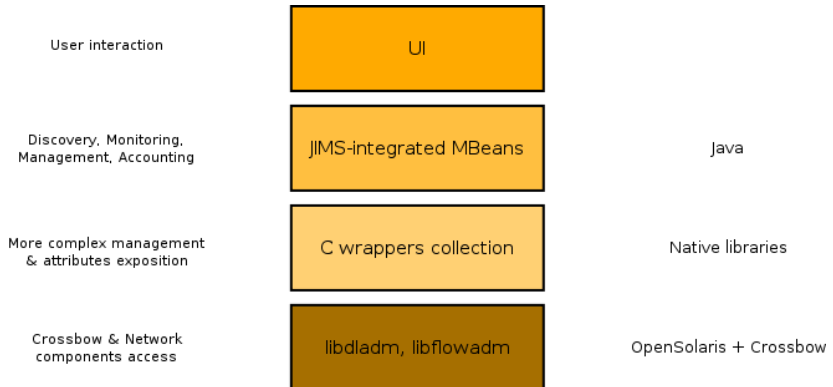# Layers and responsibility

User interaction — UI

Discovery, Monitoring, Management, Accounting — JIMS-integrated MBeans — Java

More complex management & attributes exposition — C wrappers collection — Native libraries

Crossbow & Network components access — libdladm, libflowadm — OpenSolaris + Crossbow

lib*adm

Crossbow Project libraries.

- ► libdladm provides API to manipulate VNICs, etherstubs and NICs
- ► libflowadm allows flow management (descriptors - e.g. addresses, protocols, ports, QoS - flow priority and maximum bandwidth)

Simple operations: dladm_set_flowprop, dladm_vnic_delete, etc.

Native wrappers

Exploit Crossbow lower-level *adm libraries to provide more
complex functionality.

3 modules: xbow-native-lib-etherstub,
xbow-native-lib-flow, xbow-native-lib-link.

- ▶ create_etherstub
- ▶ get_properties
- ▶ plumb

MBeans

Two kinds of objects:

- managers (EterstubManager, FlowManager, (V)NicManager)
  entity discovery, creation, deletion
- entities (flows, etherstubs, V(NIC)s)
  - per-instance attributes management and monitoring
  - hierarchy reflected in naming (e.g. MBean for `flow0` created
    over `e1000g0` link is registered as
    `<domain>:type=Flow,link=e1000g0,name=flow0`)

Most often 1:1 MBean method : Native function mapping with
return code to exception translation.

User Interface

Outline

Development and code quality

- Java and native builds with maven
- Unit tests & mocks for both MBean and native code
- Code coverage reports

Outline

Roadmap

- ▶ DONE
  C wrappers, MBeans layer $\rightarrow$ management and monitoring possible with JConsole
- ▶ ONGOING
  JIMS integration, collecting statistics
- ▶ FUTURE
  User Interface, QoS-aware zone migration