some title

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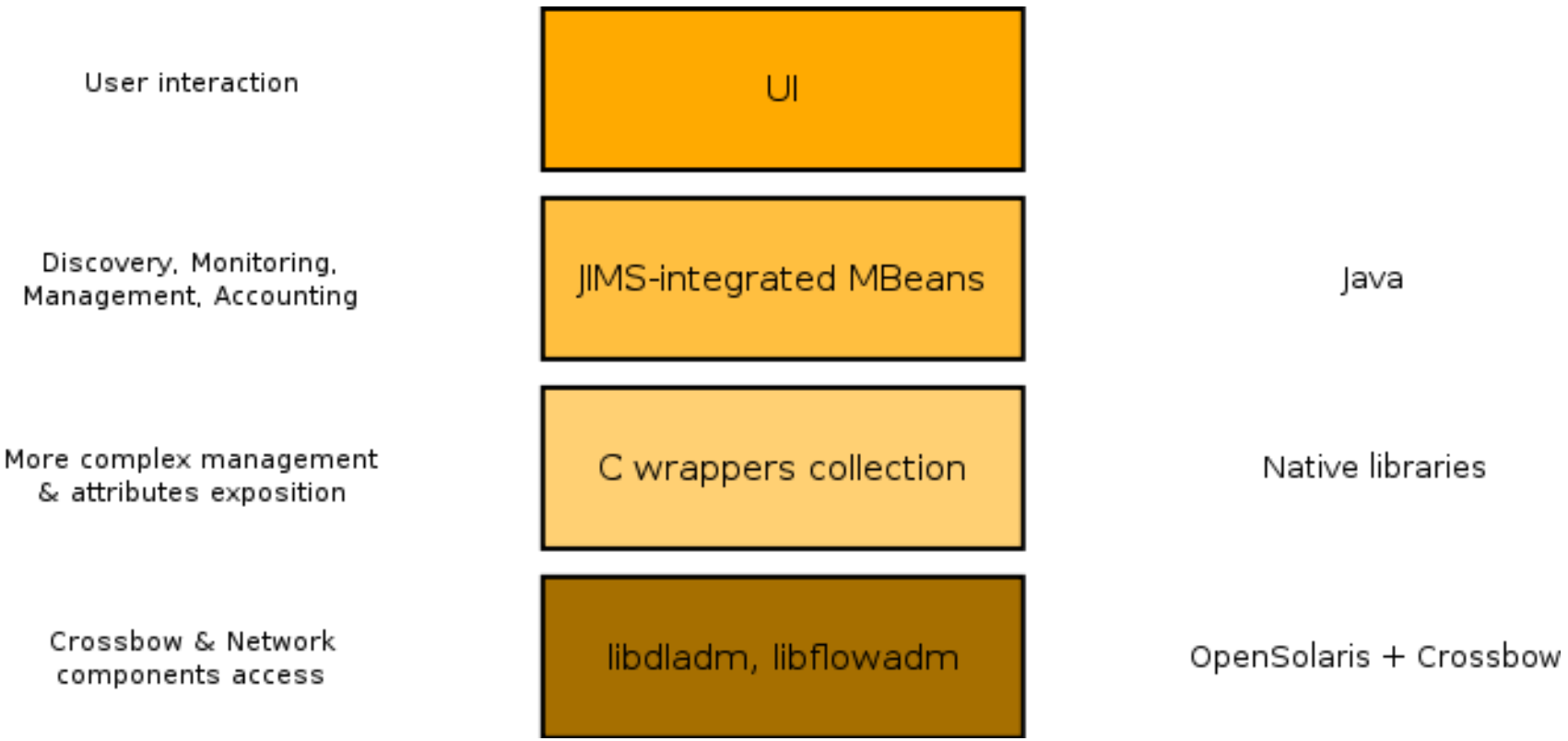
Outline

Layers and responsibility



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.

Available link operations

- Plumbing
- Putting interface up/down
- Setting ip address
- Setting mask address
- Getting parent link name

Etherstub and Link(Vnic, Nic) parameters

Read-only parameters:

- BRIDGE - The name of the bridge to which this link is assigned, if any
- OVER - The physical datalink(s) over which the datalink is operating
- STATE - The link state of the datalink. The state can be up, down, or unknown
- MTU - The maximum transmission unit size for the datalink being displayed
- CLASS - The class of the datalink. dladm distinguishes between the following classes:
  - phys - A physical datalink.
  - vnic - A virtual network interface.

Etherstub and Link(Vnic, Nic) properties

Editable properties:

- MAXBW - Sets the full duplex bandwidth for the link. The bandwidth is specified as an integer with one of the scale suffixes (K, M, or G for Kbps, Mbps, and Gbps). If no units are specified, the input value will be read as Mbps. The default is no bandwidth limit
- LEARN_LIMIT - Limits the number of new or changed MAC sources to be learned over a bridge link. The default value is 1000. Valid values are greater or equal to 0.
- CPUS - Names of processors that can perform operations for this link
- PRIORITY - Sets the relative priority for the link. The value can be given as one of the tokens high, medium, or low. The default is high

Etherstub and Link(Vnic, Nic) satistics

Read-only statistics:

- IPACKETS - Number of packets received on this link
- RBYTES - Number of bytes received on this link
- IERRORS - Number of input errors
- OPACKETS - Number of packets sent on this link
- OBYTES - Number of bytes sent on this link
- OERRORS - Number of output errors

Graphic User Interface

Possible frameworks:

- Eclipse RCP
- Jopr
- Web frameworks (Spring 3, JSP)

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 → management and monitoring possible with JConsole
- ONGOING
  JIMS integration, collecting statistics
- FUTURE
  Graphic user Interface, QoS-aware zone migration