



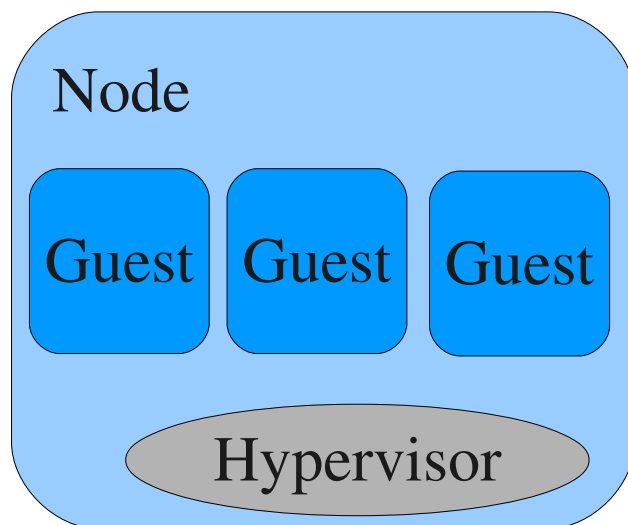
Libvirt: a virtualization API and beyond

<http://veillard.com/talks/CLKLinux2011.pdf>

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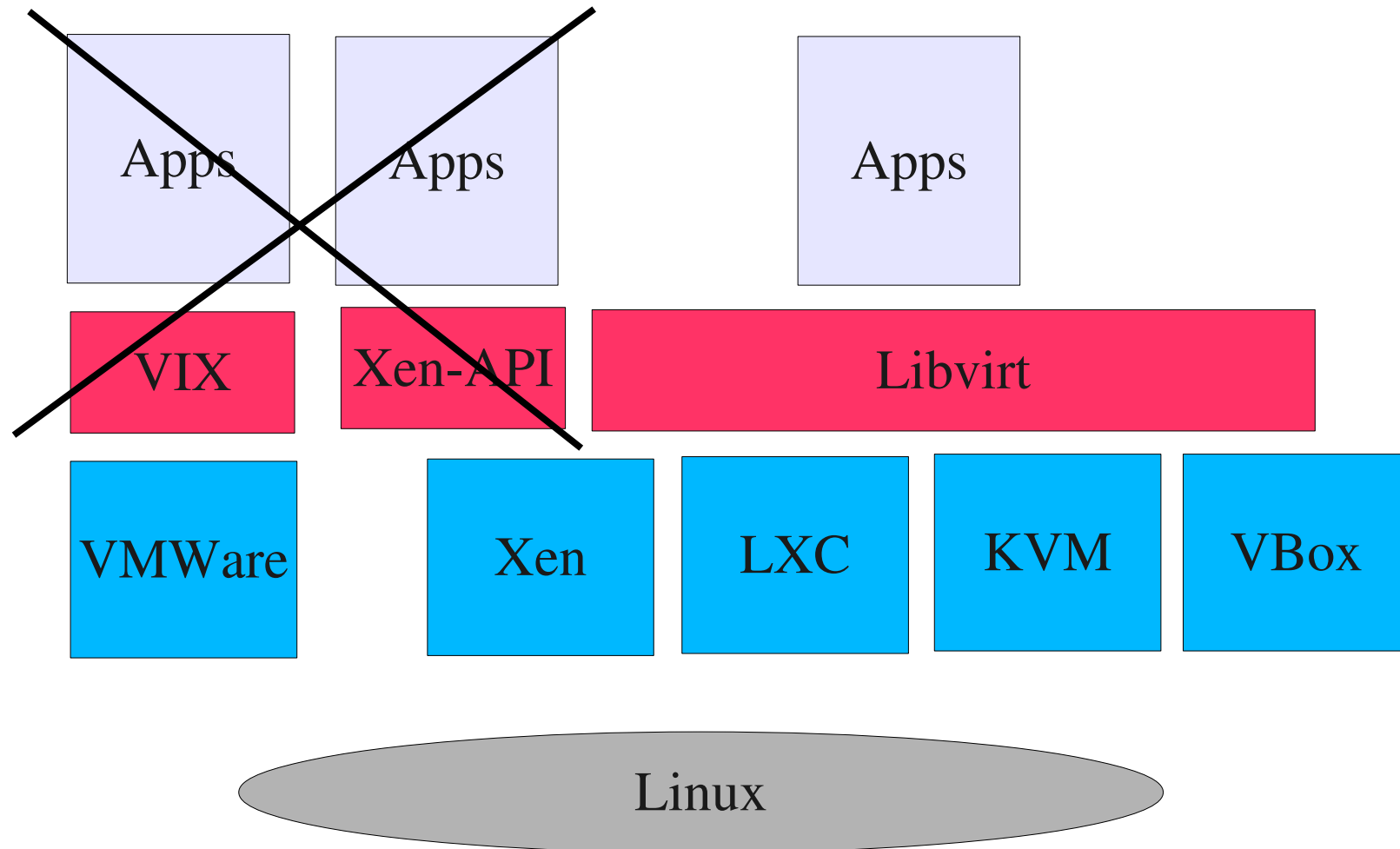
Libvirt project goals

- Web site: libvirt.org
- Virtualization library: manage guest on one node
- Share the application stack between hypervisors
- Long term stability and compatibility of API and ABI
- Provide security and remote access “out of the box”
- Expand to management APIs (Node, Storage, Network)



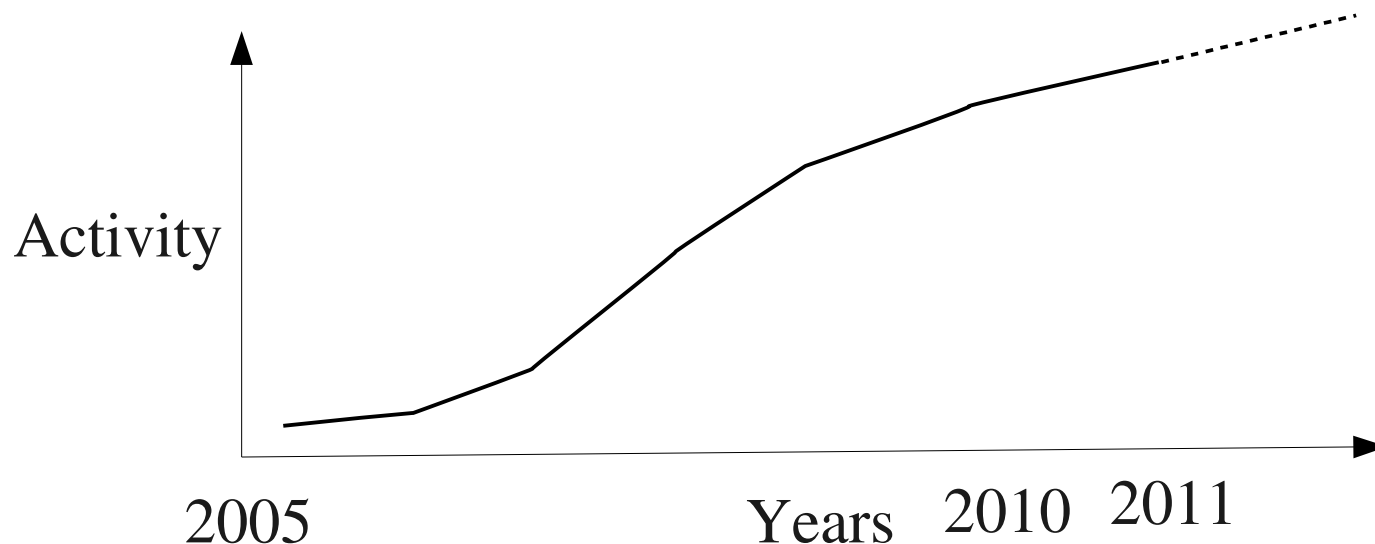
Limit duplication of efforts

Applications are costly to write and maintain !



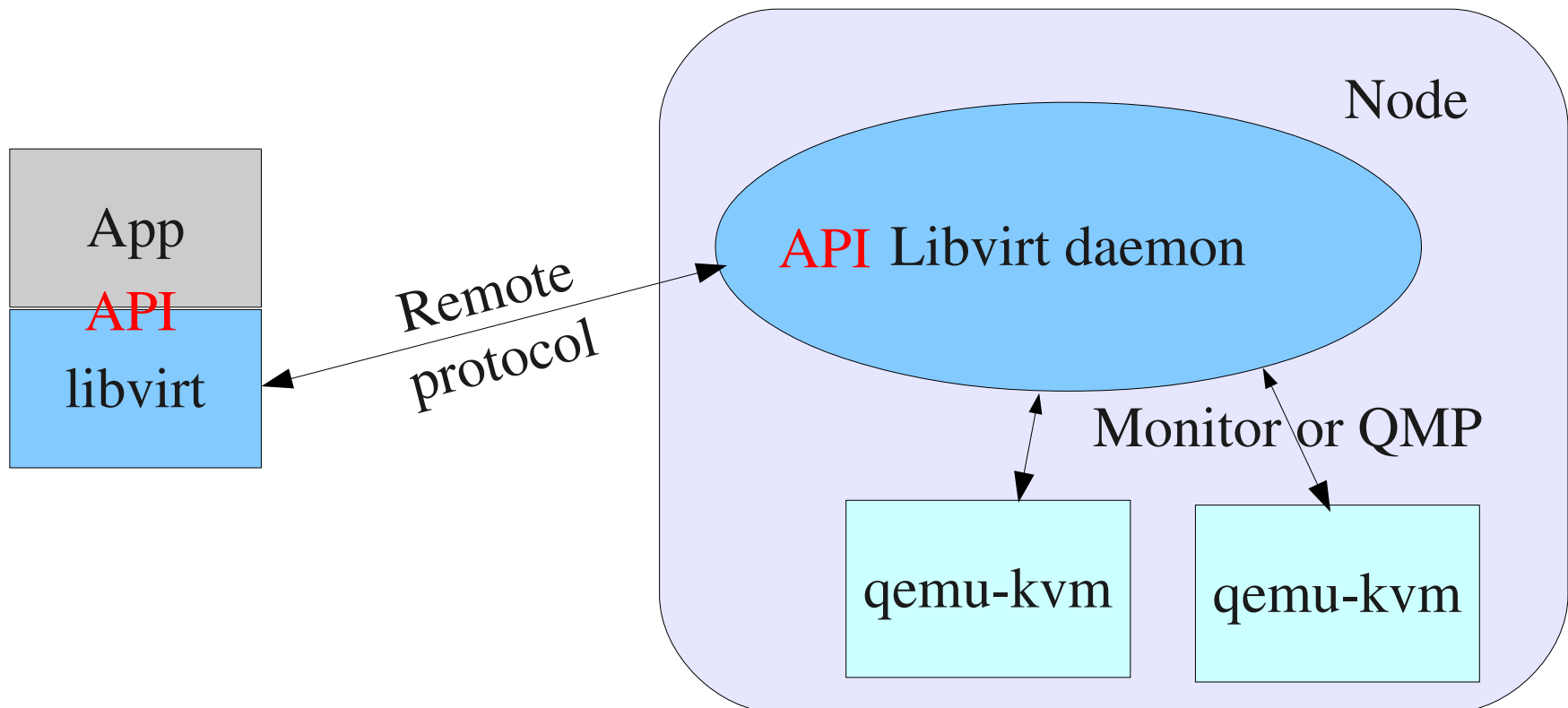
Project current status

- Started 2005, 6 years ago
 - 20 committers, 7 full time Red Hat persons
 - [Active list libvir-list@redhat.com](mailto:libvir-list@redhat.com)
 - A release every month
 - 200-300 git commits/month, 0.9.6
- Support for most hypervisors except Microsoft



Architecture of libvirt

- Application links to the library
- The libvirt daemon talks to the hypervisor on the node
- Remote protocol is tunneled securely



Current set of APIs (libvirt.h)

See the [hypervisor support page](#) for the full list

- 1) Domain state handling (save, restore, migration, core...)
- 2) Node and guests resource usage (memory, network, disk)
- 3) Security, audit and credential handling
- 4) Domain control (define, create, shutdown...)
- 5) Tuning (scheduler, memory, I/O, vcpu)

Current set of APIs (continued)

- 5) NUMA support (placement, topology, cells usage, pinning)
- 6) Dynamic or cold device attach and removal
- 7) Networking (virtual network, interfaces, filtering)
- 8) Storage handling (pools and volume)
- 9) Devices handling (enumeration, attach, detach, reset)
- 10) Asynchronous events callbacks

Recent work and TODO

- 1) Virtual switches (0.9.4)
- 2) Libxenlight and LXC driver improvements
- 3) First version of Microsoft hypervisor driver
- 4) Specific support for QEmu low level access (0.9.0 + event support)

- 1) Fine grained ACL for access control
- 2) Better desktop integration

On the work and TODO (storage)

- Integration with lock managers (0.9.4)
- Live snapshots (0.9.6)
- Improvements on storage provisioning
- Live block migration (started 0.9.2)
- Better LXC, i.e. beyond resource control to effective containment
- Dynamic control and tuning of the daemon

Kernel related support

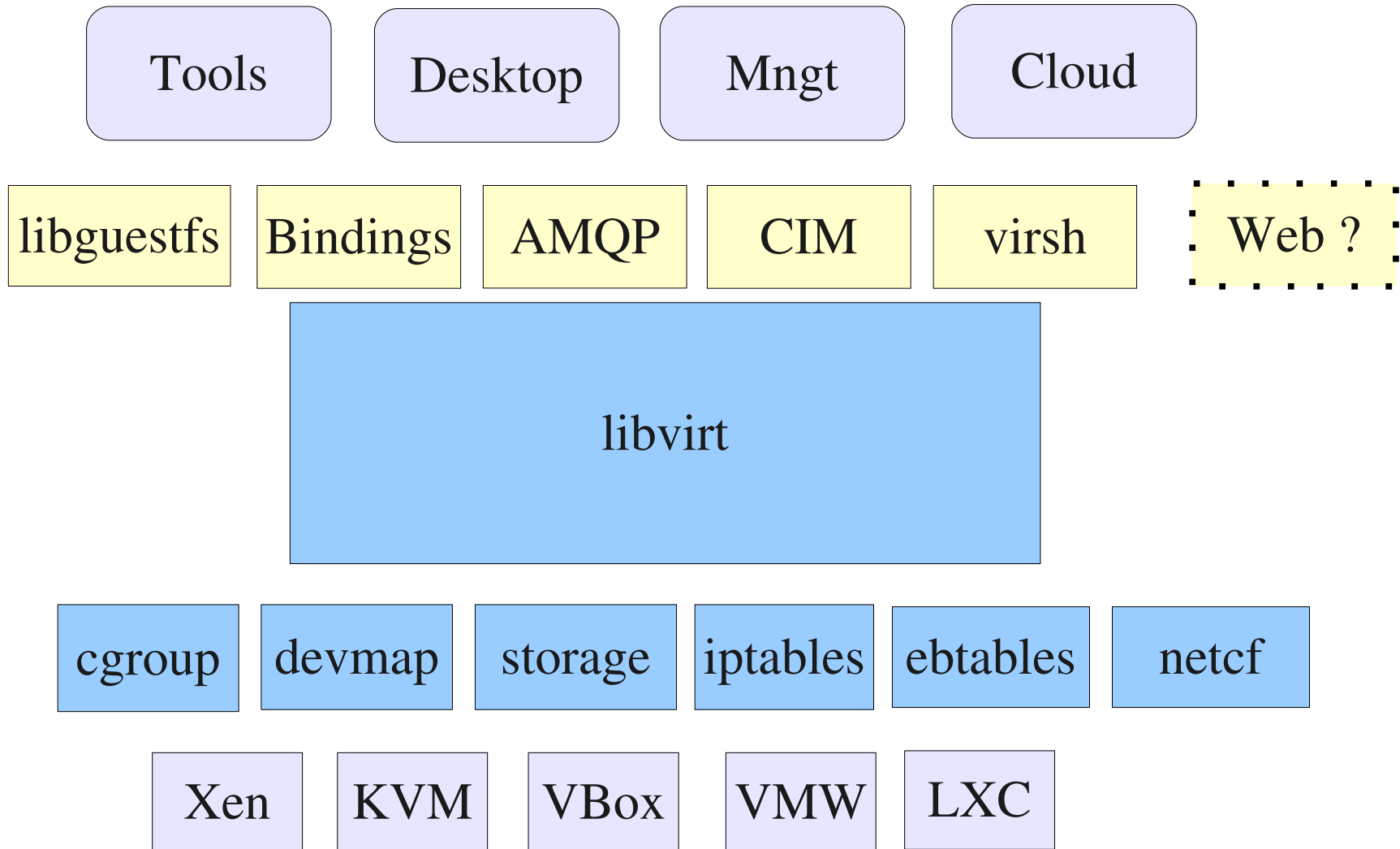
- KVM improvements
 - Performances (virtual IO, zerocopy, ...)
 - Cgroup integration
 - More platforms (PPC64, SmartOS)
- LXC Containers
 - Better resource control (fork/process#/IO)
 - Actual containment (security)
 - General usefulness

Classic libvirt applications

- **Virt-manager** (graphical GUI):
 - manage guests on a few hosts
 - Xen, Qemu/KVM support, LXC coming
- **Virsh** (CLI for libvirt)

- **Libguestfs**:
 - Read/modify guest disk images
 - Guestfish shell client
 - API with many bindings

Libvirt stack overview



Prospective work

- Access to guest from the API
 - Using matakari or virt-agent (kvm)
 - Optimize networking and storage handling
 - Better reboot support
 - General management tasks
- Access though Web/REST
 - Libvirt is not stateless, might be a challenge

Prospective work (continued)

- Higher level APIs
 - Define policies and use those for simpler APIs
 - Os specific knowledge
- Bridge with the Ovirt project
 - Simplify building cloud platform

Ovirt projects

- Umbrella project for virt and KVM related developments
 - <http://www.ovirt.org/>
 - In development, initial Workshop Nov 1-3
 - Infrastructure, governance rules
 - Ovirt-node
 - Vdsm
 - Guest agent and tools to be defined

A call to the geeks

- Some thoughts on Open Source
 - Linux is now 20 years old
 - Learning and sharing is **fun** !
 - It is relatively easy, nearly free
 - You can make a difference
 - If you do good it is public, recorded long term
 - It can even turn into a fun and good job !
- Sometimes all it takes is a good idea and a bit of time

Happy Hacking !!!



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<http://libvirt.org/>

- **Libvirt is mature**
- **It is still growing**
- **Feedback is important**
- **Let's share code !**

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Questions?

Matahari

- Agents and APIs running in the guest:
 - Provide services for management
 - Core agent (gather info, network, services)
 - Framework for adding new API on QMF
- Using AMQP protocol
- Cross platform: Linux and Windows
- Transport (Standard IP, virtio-serial guests)
- <https://github.com/matahari/matahari/wiki>

Deltacloud (Cloud APIs)

- REST web based API to **existing Clouds**
 - Support for all major cloud providers
 - EC2, RHEV-M, Rackspace ...
 - Open to add more !
- Apache project
- Part of the project is now **the Aeolus project**
 - Provides “broker service”
 - Connect to multiple clouds
 - Creation, workflow policies
 - Access and permissions