OPENNEBULA ENHANCEMENTS

Virtual Distributed Ethernet

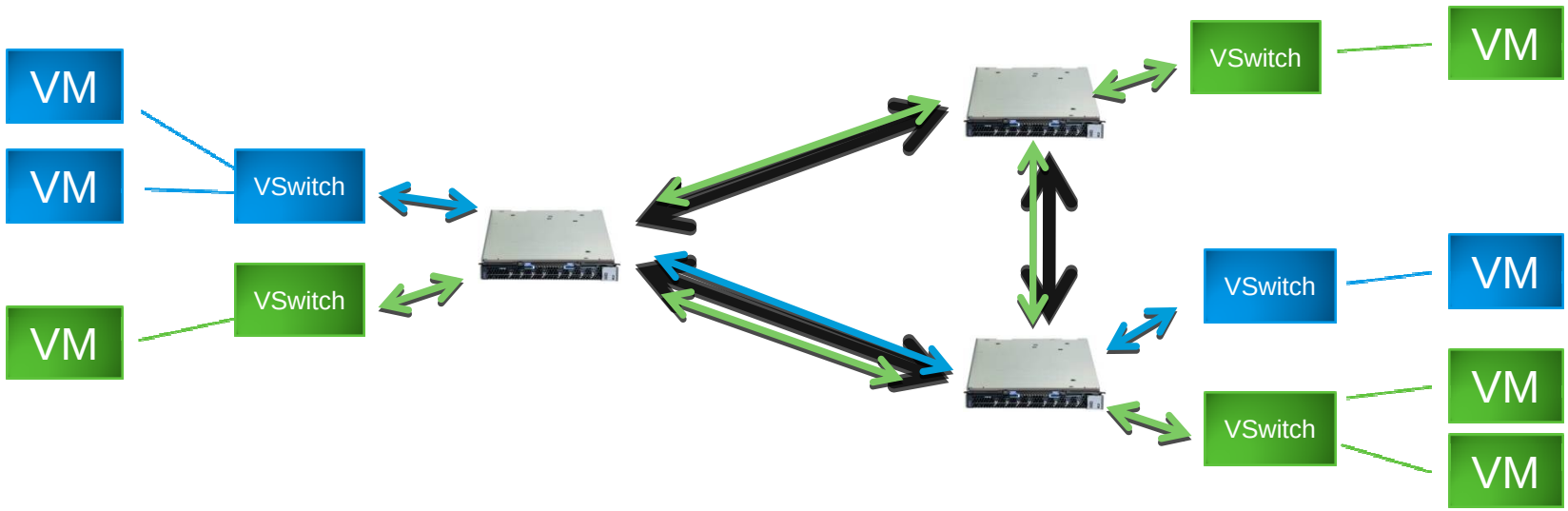
QCow image format

Web Interface prototype

Przemyslaw Syktus, Belle II Computing Workshop, Krakow ,16-18.06.2010

VIRTUAL DISTRIBUTED ETHERNET - BASICS

- Provides virtual Ethernet network for VMs
- Virtual networks are separated
- They can span over Internet



VDE – WHY?

- Issues with standard OpenNebula approach
  - Packet sniffing – possible security problem
  - Lack of traffic control – users can use whole bandwidth
- VDE – independent virtual Ethernet for each logical network
  - Connection based – no sniffing
  - Traffic control – we can apply limits for users
  - Possible client-side direct connection to virtual network

VDE COMPONENTS

- Virtual switch - vde_switch
  - Same functionality as physical switch (VLANs, STP)
- Virtual cables connecting switches
  - Programs for transferring data (i.e. ssh)
- Plugs – to connect switches/VMs with cables
- Basic router – slirpvde
  - Connects with physical network, provides DHCP
- Additional features
  - Encrypted cables, filters

VDE APPLICATION IN ONE

- All VDE components supervised by Cluster Manager
- Network architecture on demand
- Virtual networks covering part of physical network for performance
- Possibility of client-side software to connect directly with user's machines

QCOW IMAGE FORMAT

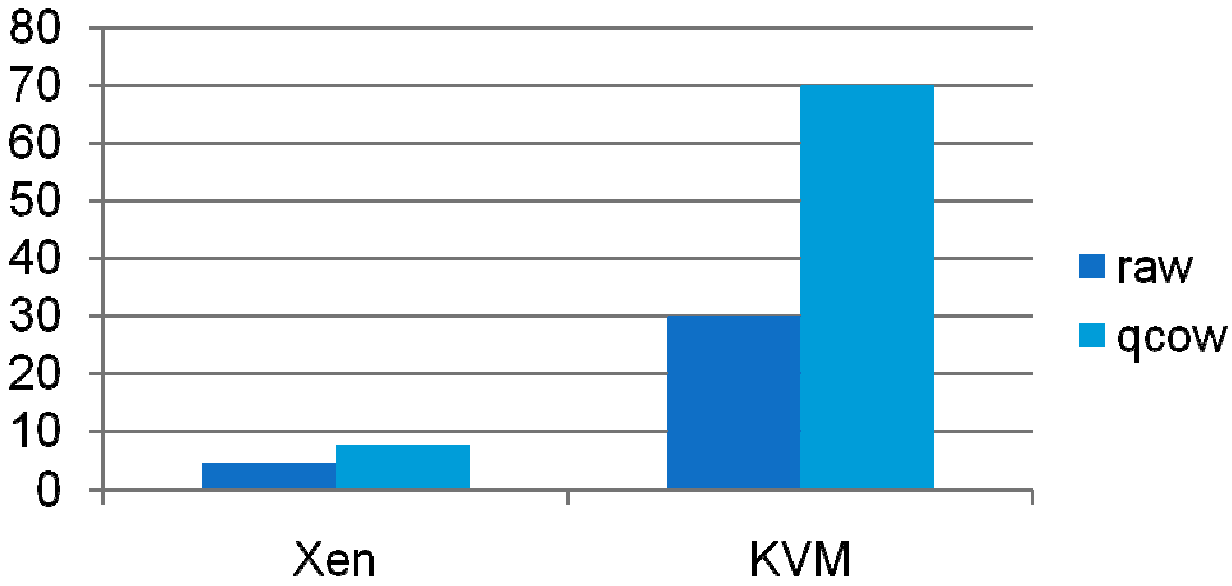
- Problems with raw images
  - Occupy more space than necessary – „holes”
  - Long time needed to transfer them to node
  - Lot of storage place used for only slightly different versions of image
- QCow as solution
  - Image space growing with usage
  - Copy-on-write images, snapshot images
  - Support for encryption and compression

QCOW APPLICATION

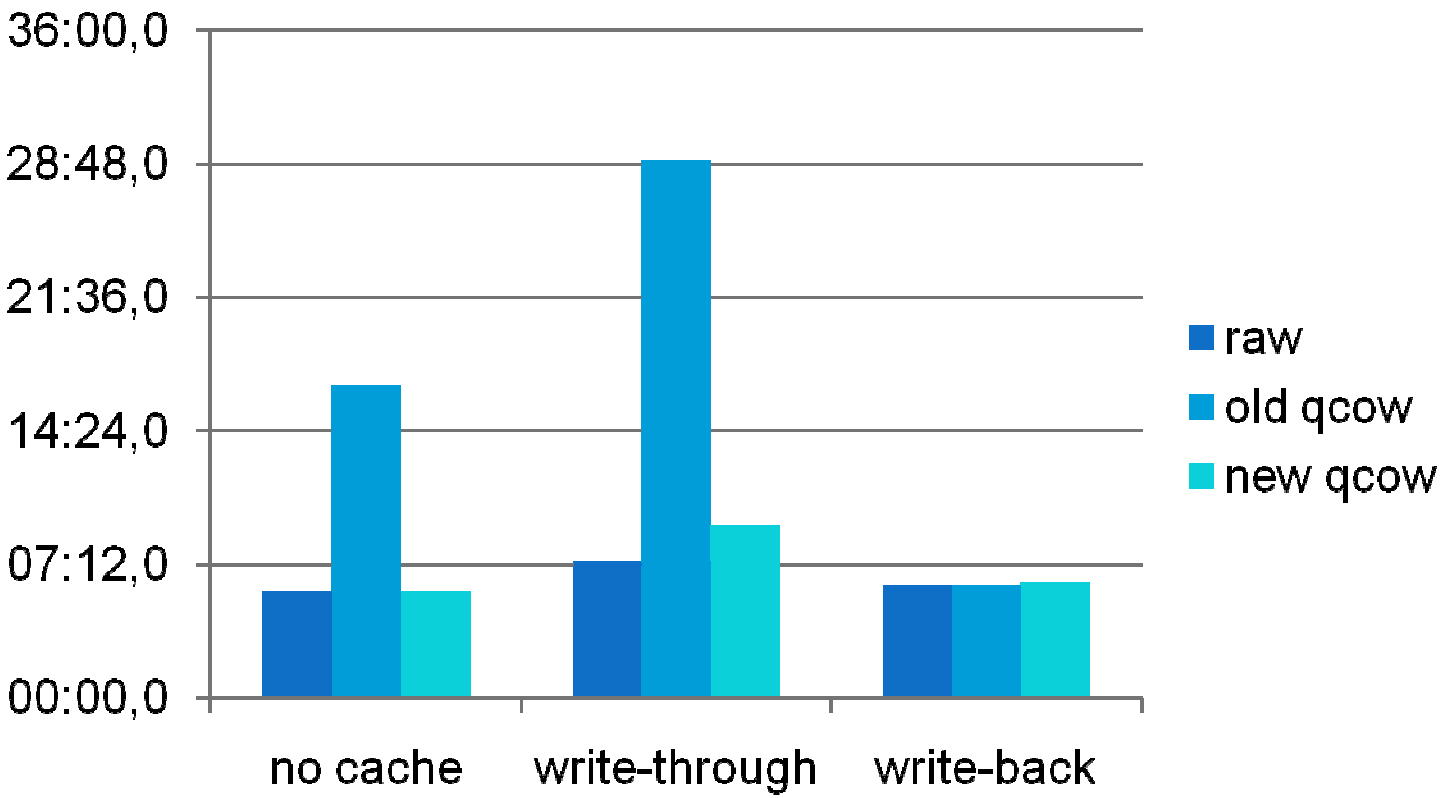
- Basic application
  - Images growing with usage
  - Smaller file size – more space for users' images
  - Almost no change to ONE
- Copy-on-write images
  - Keeping common image base on nodes – quick startup
  - Would require small changes in ONE

QCOW PERFORMANCE - GROWTH

- Tested on Windows 7 installation (min) - lots of copy/extract operations, constant image growth



QCOW PERFORMANCE – USAGE TEST

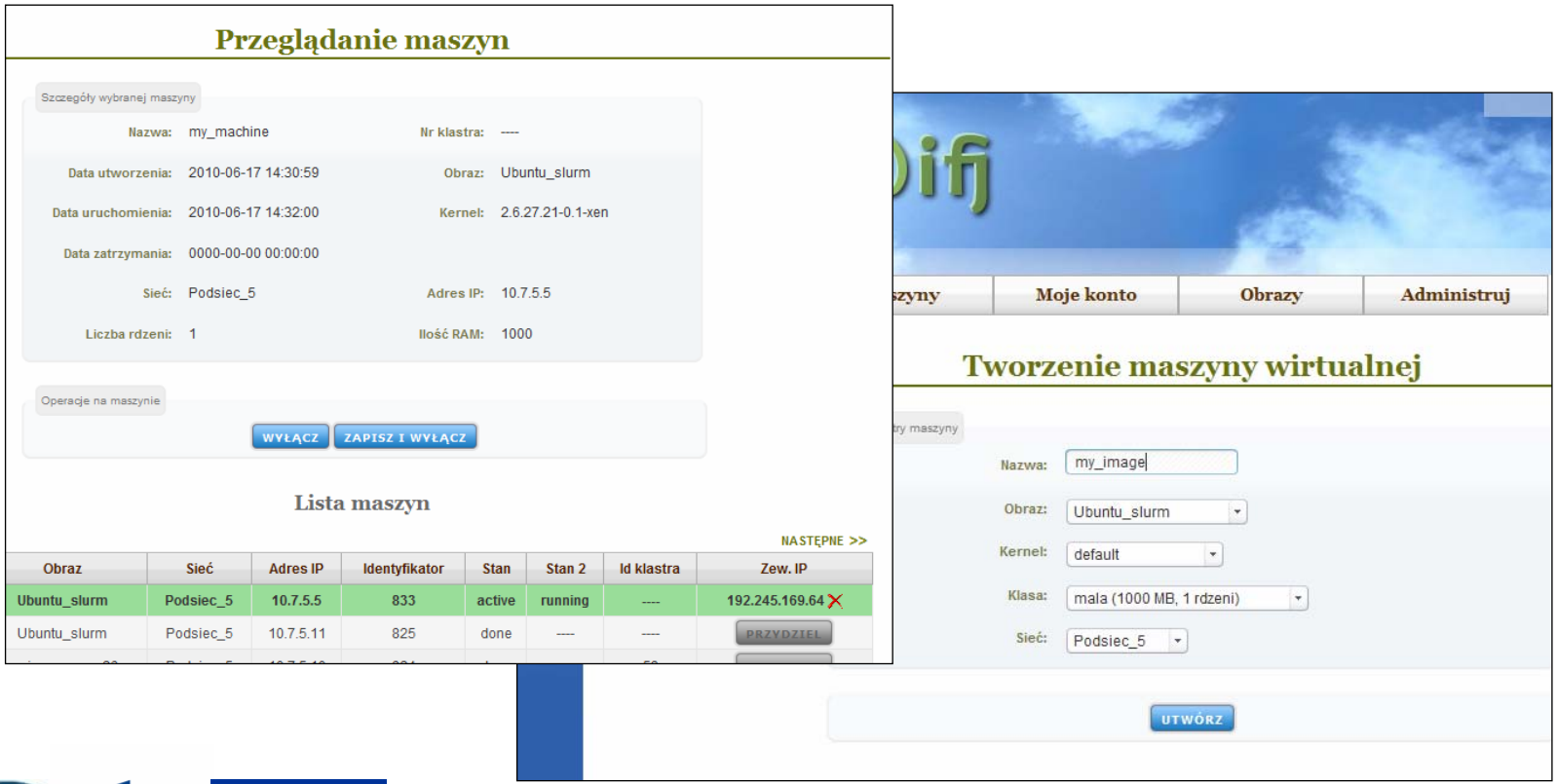


WEB INTERFACE PROTOTYPE - REASONS

- Functionalities limited/not provided by ONE
  - Easy machine deployment - premade configurations
  - Integration with networking solution
  - Automatic clustering with job scheduling
  - Image repository with group image sharing
  - Time accounting and restrictions
  - Limiting access to ONE capabilities

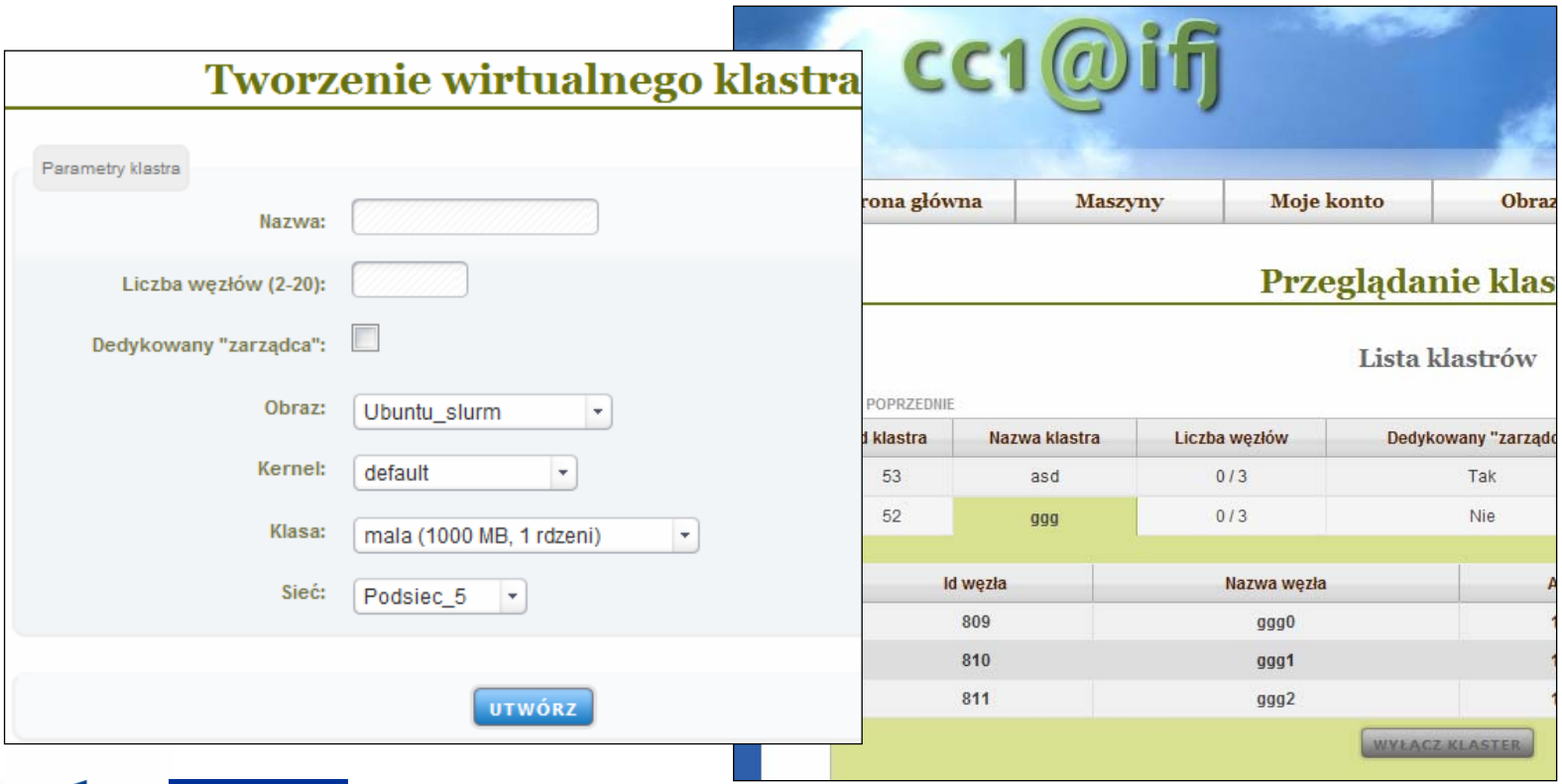
CURRENT FEATURES

VM creation/management, external IP assignment



CURRENT FEATURES

Easy clustering using SLURM as scheduler software

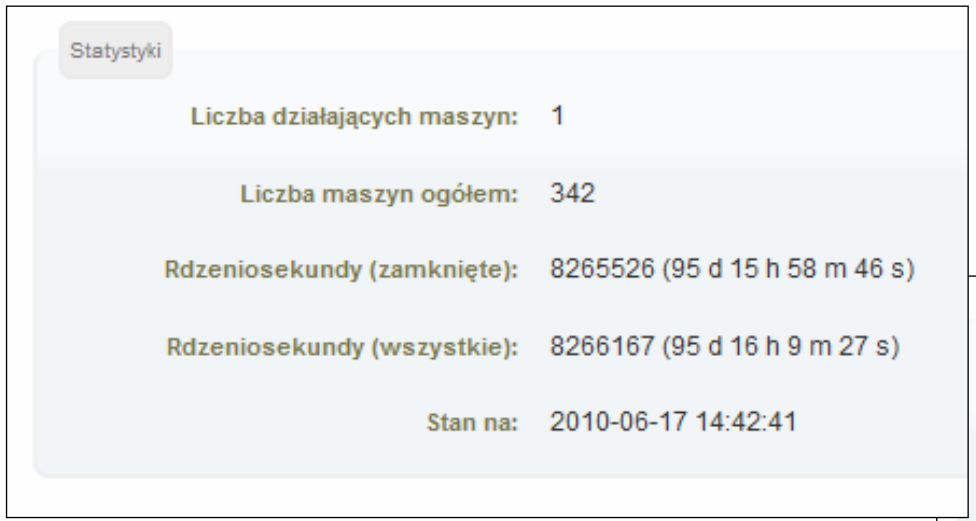


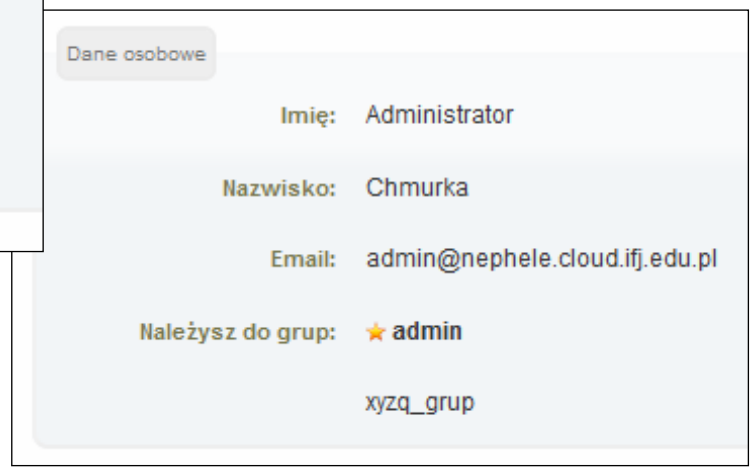
CURRENT FEATURES

Image repository with group images

CURRENT FEATURES

Account management and basic statistics





FUTURE PLANS

- Additional features for web interface
  - Storage management
  - Virtual network management
  - Additional job scheduling software (i. e. Torque)
- Development of Web Interface final version
- Application of VDE technology for automated use
- Application of QCow images for ONE with Xen