

Ganeti - Virtual Data Center

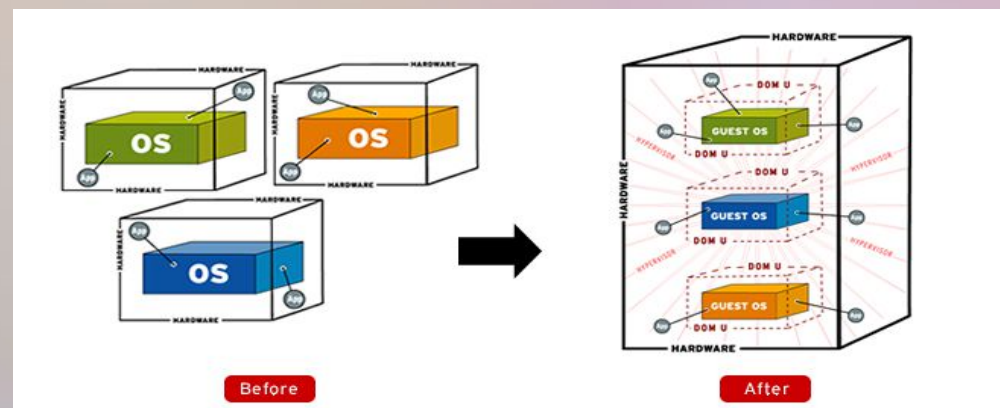


Virtualizzazione e private cloud
open source

Ospedali Riuniti di Ancona

Virtualizzazione - Vantaggi

- Ottimizzazione utilizzo risorse hardware
- Risparmio energetico
- Hardware virtuale omogeneo
- Templates di deploy dei server
- Backup/Restore rapido



Private Cloud - Vantaggi

- Alta disponibilità
- Distribuzione dei nodi su scala geografica
- Controllo diretto dei sistemi dispiegati nel cloud
- I server restano in casa..
- ..e i dati restano in casa



La Missione

- Implementazione di una piattaforma alternativa a Vmware senza rinunciare alle prestazioni ed alle features più avanzate (migrazione a caldo, failover)
- Miglioramento della scalabilità
- Ottimizzazione dell'utilizzo delle risorse HW.
- Eliminazione dei single point of failure (non necessita di uno storage condiviso)
- Monitoraggio dei sistemi
- Contenimento dei costi delle licenze →



CHALLENGE ACCEPTED



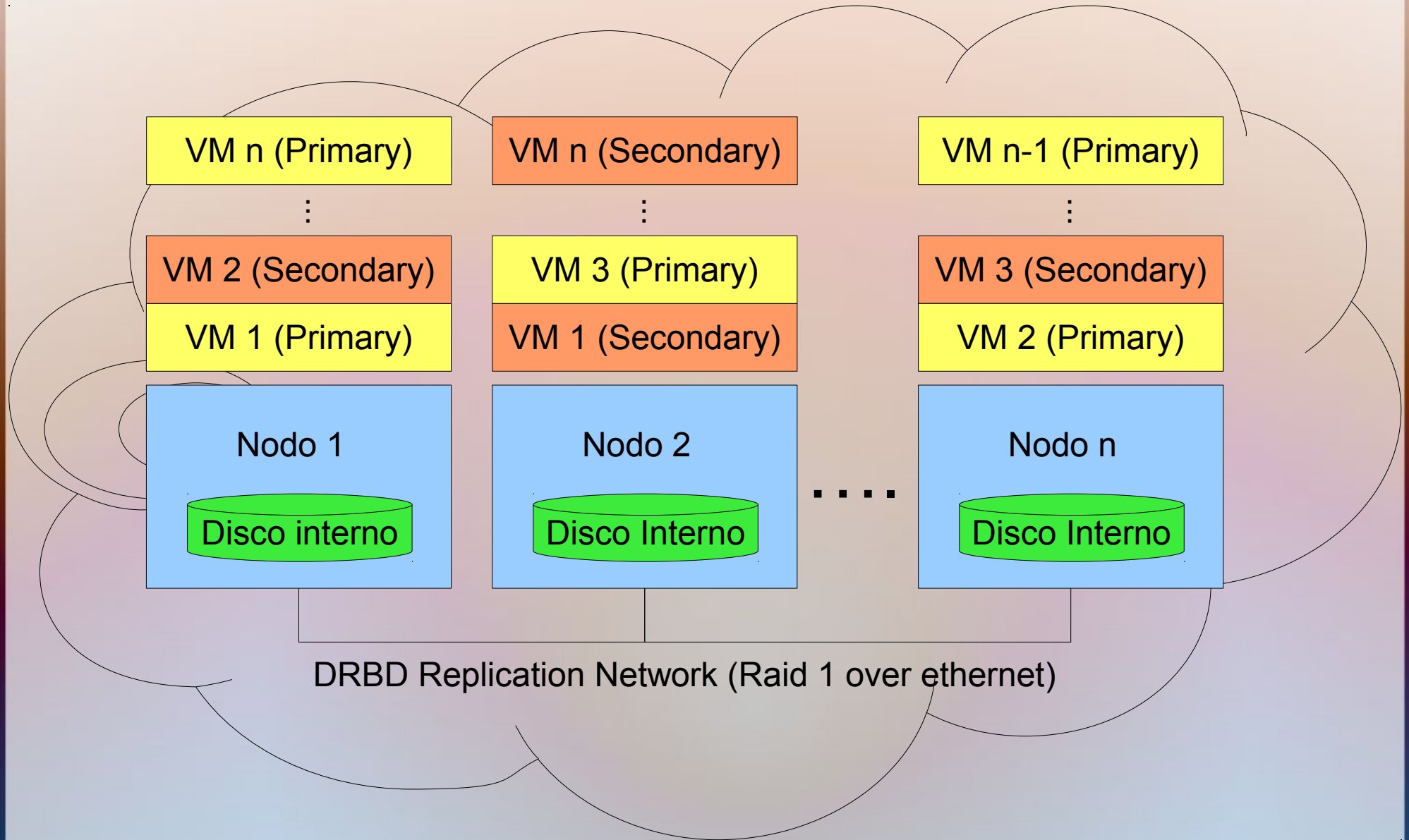
Cosa è stato realizzato

- Architettura distribuita (composta da un “cloud” di macchine fisiche);
- Scalabilità lineare dell'intero sistema
- Bilanciamento semi-automatico
- Alta disponibilità dei sistemi virtualizzati
- Assenza di “Single point of Failure” (ridondanza N+1):
- Monitoraggio capillare di tutta l'infrastruttura

Le caratteristiche di Ganeti

- Sistema di gestione di server virtuali (by Google)
- Lavora sia con KVM (Kernel Based Virtual Machine) che con XEN come virtualizzatori
- Gestisce cluster fino a 40 nodi con Ridondanza N+1
- Supporta la migrazione a caldo
- Backup – recovery (os-based) e Failover (DRBD)
- Scalabilità lineare
- Supporta sistemi guest Linux e Windows 2008 R2
- Dischi delle macchine virtuali su volumi LVM

Topologia di un cloud Ganeti



Le interfacce di gestione di Ganeti

Ganeti Web Manager

The screenshot shows the Ganeti Web Manager interface. The browser address bar indicates the URL `srv-gntwb.or.lan/cluster/deborder#virtual_machines`. The page title is "Cluster: deborder". The interface includes a sidebar with navigation options like "Overview", "Clusters", "Virtual Machines", "Templates", and "Create VM". The main content area displays a table of virtual machines with columns for Name, Node, OS, RAM, Disk Space, and vCPUs. A "Add Virtual Machine" button is visible above the table.

Name	Node	OS	RAM	Disk Space	vCPUs
✓ srv-captive.or.lan	deborder03	Default (linux-image)	2.00 GiB	6.00 GiB	6
✓ srv-dswtch.or.lan	deborder03	Default (raw-image)	7.94 GiB	190.00 GiB	4
✓ srv-esb.or.lan	deborder02	Default (linux-image)	4.00 GiB	16.00 GiB	2
✓ srv-ftp.or.lan	deborder02	Default (linux-image)	2.00 GiB	25.00 GiB	2
✓ srv-gntwb.or.lan	deborder01	Default (linux-image)	1.00 GiB	6.00 GiB	2
✓ srv-lbptr.or.lan	deborder02	Default (linux-image)	4.00 GiB	6.00 GiB	2
● srv-medmedia.or.lan	deborder01	Default (linux-image)	8.00 GiB	40.00 GiB	8
✓ srv-medtest.or.lan	deborder03	Default (linux-image)	2.00 GiB	10.00 GiB	2
✓ srv-mntr.or.lan	deborder02	Default (linux-image)	2.00 GiB	20.00 GiB	2
✓ srv-nagios.or.lan	deborder02	Default (linux-image)	2.00 GiB	20.00 GiB	4
✓ srv-nclgst.or.lan	deborder03	Default (raw-image)	8.00 GiB	160.00 GiB	4
✓ srv-netcaret.or.lan	deborder03	Default (raw-image)	4.00 GiB	40.00 GiB	2
✓ srv-ntfnt.or.lan	deborder01	Default (linux-image)	2.00 GiB	28.00 GiB	2
✓ srv-ocs.or.lan	deborder03	Default (linux-image)	2.00 GiB	10.00 GiB	2
✓ srv-orbeon.or.lan	deborder01	Default (linux-image)	7.94 GiB	32.00 GiB	4

Console

The screenshot shows a terminal window with the command `gnt-instance list` executed. The output is a table listing instances with columns for Instance, Hypervisor, OS, Primary_node, Status, and Memory.

```
root@deborder01:~/home/admmc# gnt-instance list
Instance      Hypervisor OS              Primary_node  Status  Memory
2008r2_tpl.or.lan  kvm      raw-image+default  deborder01.or.lan  ADMIN_down  -
srv-captive.or.lan  kvm      linux-image+default  deborder03.or.lan  running     2.0G
srv-dswtch.or.lan  kvm      raw-image+default  deborder03.or.lan  running     7.9G
srv-esb.or.lan     kvm      linux-image+default  deborder02.or.lan  running     4.0G
srv-ftp.or.lan     kvm      linux-image+default  deborder02.or.lan  running     2.0G
srv-gntwb.or.lan   kvm      linux-image+default  deborder01.or.lan  running     1.0G
srv-lbptr.or.lan   kvm      linux-image+default  deborder02.or.lan  running     4.0G
srv-medmedia.or.lan  kvm      linux-image+default  deborder01.or.lan  ADMIN_down  -
srv-medtest.or.lan  kvm      linux-image+default  deborder03.or.lan  running     2.0G
srv-mntr.or.lan    kvm      linux-image+default  deborder02.or.lan  running     2.0G
srv-nagios.or.lan  kvm      linux-image+default  deborder02.or.lan  running     2.0G
srv-nclgst.or.lan  kvm      raw-image+default  deborder03.or.lan  running     8.0G
srv-netcaret.or.lan  kvm      raw-image+default  deborder03.or.lan  running     4.0G
srv-ntfnt.or.lan   kvm      linux-image+default  deborder01.or.lan  running     2.0G
srv-ocs.or.lan     kvm      linux-image+default  deborder03.or.lan  running     2.0G
srv-orbeon.or.lan  kvm      linux-image+default  deborder01.or.lan  running     7.9G
srv-oriam-test.or.lan  kvm      linux-image+default  deborder01.or.lan  running     6.0G
srv-pgwb.or.lan    kvm      linux-image+default  deborder02.or.lan  running     8.0G
srv-picasso1.or.lan  kvm      linux-image+default  deborder03.or.lan  running     4.0G
srv-picasso-test.or.lan  kvm      linux-image+default  deborder02.or.lan  running     2.0G
srv-rmbs.or.lan    kvm      linux-image+default  deborder01.or.lan  running     1.0G
srv-rproxy.or.lan  kvm      linux-image+default  deborder03.or.lan  running     2.0G
srv-scsdb.or.lan   kvm      linux-image+default  deborder01.or.lan  running     16.0G
srv-scsla.or.lan   kvm      linux-image+default  deborder02.or.lan  running     8.0G
srv-synca.or.lan   kvm      linux-image+default  deborder03.or.lan  running     2.0G
srv-thin.or.lan    kvm      linux-image+default  deborder03.or.lan  running     4.0G
srv-trpntdb.or.lan  kvm      linux-image+default  deborder03.or.lan  running     4.0G
srv-trpntwb.or.lan  kvm      linux-image+default  deborder02.or.lan  running     4.0G
srv-trsf.or.lan    kvm      raw-image+default  deborder02.or.lan  running     4.0G
srv-vrlim.or.lan   kvm      raw-image+default  deborder01.or.lan  running     4.0G
srv-webmail.or.lan  kvm      linux-image+default  deborder01.or.lan  running     2.0G
srv-wrd02.or.lan   kvm      raw-image+default  deborder02.or.lan  running     8.0G
srv-www.or.lan     kvm      linux-image+default  deborder01.or.lan  running     2.0G
root@deborder01:~/home/admmc#
```

Monitoraggio con Nagios

The screenshot displays the Nagios web interface with the following components:

- Current Network Status:** Last update: Thu, 21 17:38:48 CEST 2012. Updated every 30 seconds. Nagios Core v3.2.1. www.nagios.org. Logged in as marco.casavola@... View Help For The Host. View Notifications For The Host. View Service Status Grid For All Hosts.
- Host Status Totals:** Up: Down: Unreachable: Pending: 0: 0: 0: 0.
- Service Status Totals:** OK: Warning: Unknown: Critical: Pending: 12: 0: 0: 0: 0.
- Service Status Details For Host 'deborder01':**

Host	Service	Status	Last Check	Duration	Attempt	Status Information
deborder01	DNS/Traffic	OK	2012-08-21 17:38:08	26d 5h 5m 57s	1/3	RX Bytes: 250B, TX Bytes: 240B, RX Speed: <198Bps, TX Speed: <140Bps, OK bandwidth utilization
deborder01	DNS/Response	OK	2012-08-21 17:37:45	36d 5h 5m 55s	1/3	OK - FreeRAM: 322270784, FreeSwap: 395214144, Buffer: 58402096 - Cache: 17897652
deborder01	FreeRam	OK	2012-08-21 17:37:52	36d 5h 5m 55s	1/3	TOP OK: 0.001 seconds response time on port 1811, RV Bytes: 2906B, TX Bytes: 5400B, RX Speed: 102017Bps, TX Speed: 204720Bps, OK bandwidth utilization
deborder01	FreeSwap	OK	2012-08-21 17:37:14	36d 5h 5m 55s	1/3	OK - FreeRAM: 322270784, FreeSwap: 395214144, Buffer: 58402096 - Cache: 17897652
deborder01	Load	OK	2012-08-21 17:36:46	36d 5h 5m 29s	1/3	OK - load average: 1.11, 0.72, 0.70
deborder01	Network/Traffic	OK	2012-08-21 17:37:28	36d 5h 5m 44s	1/3	RX Bytes: 260B, TX Bytes: 4050B, RX Speed: 6246Bps, TX Speed: 481Bps, OK bandwidth utilization
deborder01	PING	OK	2012-08-21 17:37:22	8d 8h 45m 39s	1/3	PING OK: Packet loss = 0%, RTT = 0.32 ms
deborder01	SSH	OK	2012-08-21 17:37:58	36d 4h 43m 15s	1/3	SSH OK: CheckSsh_Loag (Cronjob-Request) (cronjob 2.0)
deborder01	Storage_IOActivity	OK	2012-08-21 17:38:07	28d 4h 33m 15s	1/3	CHECK_DISKIO OK: /tmp/swap WRITE=225028 READ=958 TOTAL=225988
deborder01	SystemDisk	OK	2012-08-21 17:33:46	35d 4h 43m 15s	1/3	DISK OK - free space = 14796 MB (72% inode=99%)
deborder01	System_IOActivity	OK	2012-08-21 17:37:58	36d 5h 5m 55s	1/3	CHECK_DISKIO OK: /var/lib/mysql RW=17668B READ=17668B TOTAL=353376B
- Services:** A list of services for 'deborder01' with status indicators and action buttons. Services include: database_MySQL, FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, V_LanNetworkTraffic, FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, P, FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, PING, WinAvailableDataDiskSpace, WinAvailableDiskSpace, WinAvailableRam, WinCPU, WinNetIncomingTraffic, WinNetOutgoingTraffic, WinServicesState, FreeRam, HTTP, Load, MySQL_Status, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity.
- Hosts List:** A list of hosts with their status and service links:
 - srv-orbeon: FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-oriam-test: FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-pgwb: AlboConnections, AlboQueryTimes, AlboStatistics, DataDisk, Data_IOActivity, FreeRam, Load, NetworkTraffic, PGWbDBSize, PING, SSH, SystemDisk, System_IOActivity
 - srv-picasso1: CUP_Sisprest, FreeRam, HTTP, B0B0_Picasso, Load, NetworkTraffic, PING, Ris-GE, SSH, SSL-HTTP_8443_Picasso, SystemDisk, System_IOActivity
 - srv-rmb5: FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-rproxy: FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-sc5db: DataDisk, Data_IOActivity, FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-sc5la: FreeRam, Load, NetworkTraffic, PING, SSH, SSL-HTTP_8443, SambaShare_SCS, SystemDisk, System_IOActivity
 - srv-svnc4: FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-thin: ActiveThinClients, FreeRam, Load, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity
 - srv-trpntdb: FreeRam, Load, MySQL_Status, NetworkTraffic, PING, SSH, SystemDisk, System_IOActivity, VNC_Service
 - srv-trpntwb: FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SSL-HTTP, SystemDisk, System_IOActivity, VNC_Service
 - srv-trsf: HTTP, PING, WinAvailableDiskSpace, WinAvailableRam, WinCPU, WinNetIncomingTraffic, WinNetOutgoingTraffic, WinServicesState
 - srv-vrlimn: HTTP, PING, WinAvailableDiskSpace, WinAvailableRam, WinCPU, WinNetIncomingTraffic, WinNetOutgoingTraffic, WinServicesState
 - srv-wrd02: PING, RDPActiveSessions, RDPInactiveSessions, RDPTotalSessions, RemoteDesktopService, WinAvailableDiskSpace, WinAvailableRam, WinCPU, WinNetIncomingTraffic, WinNetOutgoingTraffic, WinServicesState
 - srv-www: FreeRam, HTTP, Load, NetworkTraffic, PING, SSH, SSL-HTTP, SystemDisk, System_IOActivity
- Performance Graphs:** Two graphs showing load over time for 'deborder02'. The top graph is a 2 Daily Graph showing Load1, Load5, Load15, and Average. The bottom graph is a 3 Weekly Graph showing the same metrics over a longer period.
- Navigation:** A bottom bar with image thumbnails: cloud.jpg, ChallengeAccepted.png, before-after.png, make it work.png, in-house.jpg.

Il nostro Contributo

- Implementazione delle opzioni a riga di comando (per KVM) che abilitano 2 CDROM virtuali, il Tipo di CPU, l' I/O nativo e la differenziazione del tipo di emulazione tra dischi e CDROM (Es Cdrom Ide e dischi Paravirtual)
- Implementazione di 2 definizioni di sistemi operativi Linux e Raw (ovvero Linux e Windows) con l'apertura di un nuovo progetto su sourceforge: Ganeti-OS-Definitions
<http://sourceforge.net/p/ganeti-os-defs/home/Home/>

Elenco dei software Integrati

- Debian GNU Linux: la roccia su cui poggia tutto il progetto (<http://www.debian.org/>)
- Linux KVM: Kernel-based Virtual Machine (http://www.linux-kvm.org/page/Main_Page)
- Ganeti: the core (<http://code.google.com/p/ganeti/>)
- Ganeti Web Manager: Interfaccia Web di Gestione (<http://code.osuosl.org/projects/ganeti-webmgr>)
- Nagios: Monitoraggio (<http://www.nagios.org/>)
- Nagios Grapher: grafici di utilizzo delle risorse (<http://sourceforge.net/projects/nagiosgrapher/>)

Domande e risposte

