

Hâpy

OpenNebula GNU/Linux distribution for two french ministries

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Pôle de Compétences Logiciels Libres

OpenNebula TechDay Paris 2015

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Pôle de Compétences Logiciels Libres

FOSS and agility in french Minister of National Education

- Main mission is to maintain the EOLE GNU/Linux meta-distribution
- [CeCILL](#) / [GPL](#) software licensing
- Agile consulting for other development teams

The EOLE GNU/Linux meta-distribution

EOLE: GNU/Linux meta-distribution

Ensemble Ouvert Libre et Évolutif

- Local project in [educational constituency of Dijon](#) in 2000
- National project in 2001 to protect students and administrative datas
- Based on Mandrake Linux
- Switched to Ubuntu GNU/Linux in 2007

Turnkey solutions for national education

One ISO to rule them all

From elementary to high school

- Zéphir: Centralised server management
- Amon: Firewall, proxy and IPSec VPN
- Sphynx: VPN concentrator
- Horus: Administrative staff Samba server
- Scribe: Student communication and file server
- AmonEcole: Merge Amon and Scribe functionalities with containers
- Eclair: LTSP server
- Seshat: Centralised MTA and web SSO
- Thot: Centralised LDAP

Highly adaptable

Patch and extend

- Variables declared in XML files
- Python Cheetah templates of configuration files
- Pre/post scripts (ex: populate database)

Adapt or create your own derivatives to fit your needs

MEDDE derivatives

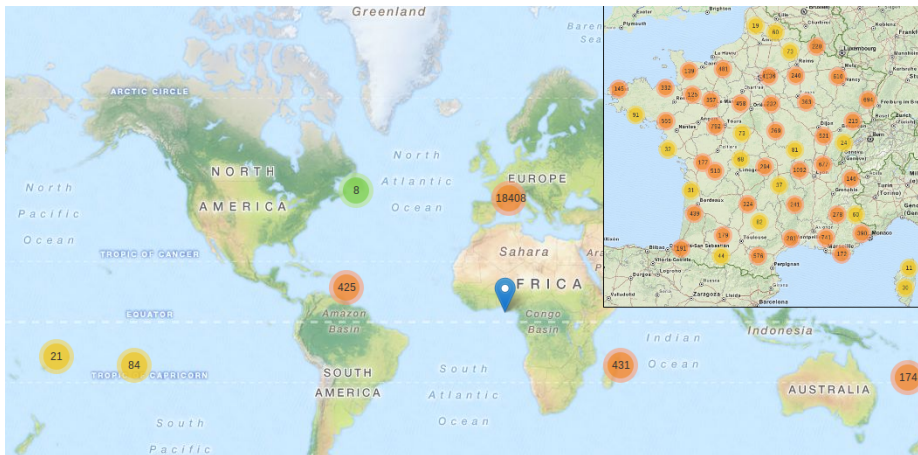
Variation and new servers

Ministère de l'écologie, du développement durable et de l'environnement (MEDDE) created their own derivatives

- eSSL: variant of firewall Amon (2009)
- eCDL: NT domain controller (2011)
- eSBL: file server, plugged on eCDL (2011)

Largely deployed

Even on a boat, not on the map ;-)



Bare metal to configured server in 30 mn

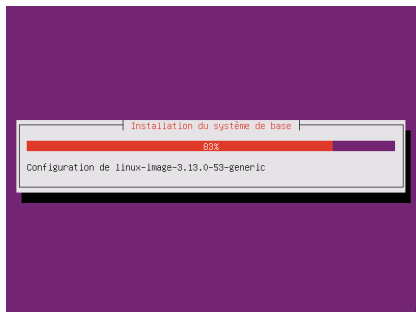
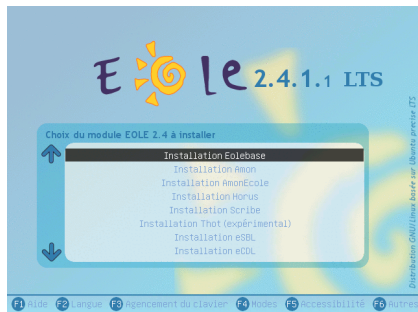
3 little steps for humans

- 1 Installation from ISO
- 2 Configuration
- 3 Deployment

Each step can be done by different people

Automatic installation from hybrid ISO

OEM like install



A web interface for configuration

Local on the server or central on Zéphir

GenConfig

Fichier ? Aide Mode Normal

Amonecole 2.5.0

Général

Établissement

1 Identifiant de l'établissement (exemple UA) 00000003

2 Nom de l'établissement etb3

Paramètres réseau globaux

1 Nom de la machine amonecole

2 Nom de domaine privé du réseau local etb3.lan

3 Nom de domaine académique (ex : ac-dijon) ac-test

4 Suffixe du nom de domaine académique fr

5 Nombre d'interfaces à activer 2

6 Utiliser un serveur mandataire (proxy) pour accéder à Internet non

7 Adresse du serveur NTP pool.ntp.org

8 Adresse IP du serveur DNS 192.168.232.2

9 Fuseau horaire du serveur Europe/Paris

10 Serveur de mise à jour test-ecole-ac-dijon.fr

Powered By EOLE

Instantiate the server

Generate config files and start services

- 1 Register the server on Zéphir
- 2 Retrieve the configuration
- 3 Run *instance*

Manage and monitor the server

command line or web interface

The screenshot displays the 'Administration' section of the 'amonocole' web interface. The top navigation bar includes 'Administration', the user 'amonecole', and a connection status 'VOUS ÊTES CONNECTÉ(E) EN TANT QUE ADMIN' with a 'Déconnexion' button.

The left sidebar lists various management actions under 'Actions sur le serveur':

- Accueil
- Configuration générale
 - Règles du pare-feu
 - Cache et Authentification
- Documents
- Filtre web 1
 - Groupe de machine
 - Sources et destinations
 - Sites
 - Règles du pare-feu
 - Utilisateurs
- Gestion
 - Édition groupée
 - Groupes
 - Création de groupe
 - Recherche de groupe
 - Partages
 - Utilisateurs
 - Création d'utilisateur
 - Recherche d'utilisateur
 - Page des comptes
- Importantes
- Outils
 - Gestion des Acls
 - Bande passante
 - DHCP statique
 - Importation
 - Synchronisation AMF
 - Signalement
 - Statistiques proxy
 - Quotas disque
 - Gestion des listes
 - VNC
 - Détection de virus
 - Connexion
 - Stations
 - Sauvegardes
 - Système
 - Édition de rôles

The main content area is divided into several sections:

- MISE À JOUR**: Dernière mise à jour : 2015-07-03 12:56:33,608: INFO - Mise à jour le vendredi 03 juillet 2015 12:56:33. Includes a button 'Afficher le rapport'.
- SAUVEGARDE**: Dernière sauvegarde : Aucune sauvegarde.
- LISTE DE SITES INTERDITS**: Dernière mise à jour de la liste de sites interdits : Mise à jour le 25.06.2015 à 01:21. Includes a button 'Afficher le rapport'.
- IMPORTATION**: Dernière importation : 2015-06-25 08:42:39 - INFO 88 Lecture des enseignants... 88. Includes a button 'Afficher le rapport'.
- SERVICES**: **ETAT DES SERVICES** table with columns 'Utilisation' and 'DETAILS'.

Utilisation	DETAILS
Services	DETAILS
Système	DETAILS

Below the 'SERVICES' section, there are several status indicators with green circular icons:

- Etat des interfaces réseau
- Etat des démons bacula
- Etat des services
- Services distants
- Réponse du service EoleSSO
- Occupation des disques
- Informations système
- Statistiques réseau
- Etat des sommes MD5 de paquets

Road to a new galaxy

Why did we get to OpenNebula?

Bare metal elastic limit is too low

- Testing our OS was done on physical desktop computers
- Some “lucky” developers could have at most 2 VMs on their workstation

EOLE development needed elasticity

Looking for virtualisation infrastructure

Many choices: too big, not enough flexible or immature

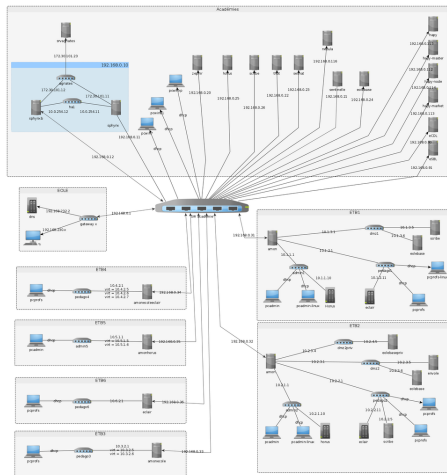
2012: two new quite powerful workstations \Rightarrow testing party

- Proxmox needed a reboot to add a new network
- Archipel barely emerged
- Ganeti was promising
- OpenStack was already too much

Start with OpenNebula 3.8

Complete virtual infrastructure per user

- Standard network names
- VLAN isolated networks
- One user == one gateway
- Generated with Jenkins

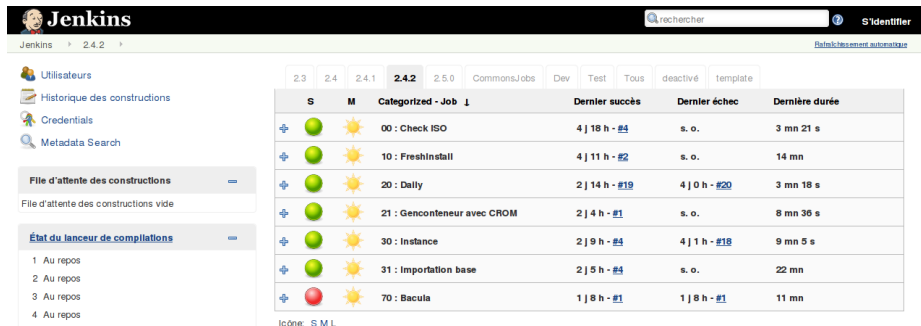


Sharing VM templates requires avoiding *UNAME* on networks

Pilot OpenNebula from Jenkins

Continuous integration of OS

- Check installation from ISO
- Check default configurations
- Check daily upgrade to find broken packages
- Check user database import



The screenshot shows the Jenkins web interface. At the top, there's a search bar and a 'S'identifier button. Below the header, the Jenkins version is 2.4.2. The main content area displays a table of build jobs. The table has columns for status (S), month (M), job name, last success, last failure, and last duration. The jobs listed are: 00: Check ISO, 10: FreshInstall, 20: Daily, 21: Genconteneur avec CROM, 30: Instance, 31: Importation base, and 70: Bacula. The status icons are green for successful and red for failed. The 'Daily' job is currently running, indicated by a sun icon.










S	M	Categorized - Job ↓	Dernier succès	Dernier échec	Dernière durée
+	●	00 : Check ISO	4 j 18 h - #4	s. o.	3 mn 21 s
+	●	10 : FreshInstall	4 j 11 h - #2	s. o.	14 mn
+	●	20 : Daily	2 j 14 h - #19	4 j 0 h - #20	3 mn 18 s
+	●	21 : Genconteneur avec CROM	2 j 4 h - #1	s. o.	8 mn 36 s
+	●	30 : Instance	2 j 9 h - #4	4 j 1 h - #18	9 mn 5 s
+	●	31 : Importation base	2 j 5 h - #4	s. o.	22 mn
+	●	70 : Bacula	1 j 8 h - #1	1 j 8 h - #1	11 mn

icône: [S](#) [M](#) [L](#)

Jenkins jobs produce ready to use VMs

Reduce environment setup time

Select a Template

System	VDC	Saved
		2.4.1.1 scribe
aca.scribe-2.4.1.1  ...	aca.scribe-2.4.1.1-Daily  ...	etb1.scribe-2.4.1.1  ...
etb1.scribe-2.4.1.1-Daily  ...	etb2.scribe-2.4.1.1  ...	etb2.scribe-2.4.1.1-Daily  ...
aca.scribe-2.4.1.1- instance-Aveclmport  ...	etb1.scribe-2.4.1.1- instance-default  ...	etb1.scribe-2.4.1.1- instance-Aveclmport  ...

Remove physical limitations

Test beds was burning

- The two dedicated workstations was fine for testing
- Bumped memory to 2x32GB

NFS access on workgroup NAS was too slow

Two 24 CPU 96GB RAM Blades with 3TB GFS2 on SAN

Road to Hâpy-ness

2013: talk at our annual seminary

Teasing inside

General presentation of OpenNebula

High interest from our community to add it on the ISO

First steps to OpenNebula distribution

The community wanted it, the community did it

Common elaboration between



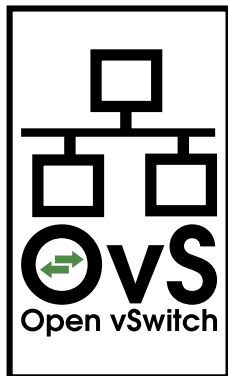
Cadole



Hypervisor



Virtual network



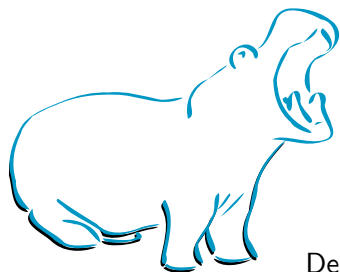
2014: presentation of the work in progress

Show must go on

- Only the first part was funded
- Single node OpenNebula
- Preparation of virtual networks from Zéphir
- Preparation of datastores from Zéphir
- Automated deployment of EOLES servers based on Zéphir

Engagement of MEDDE to finalise it

2015: Hâpy new distributions



Deification of annual flooding of the Nile

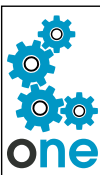
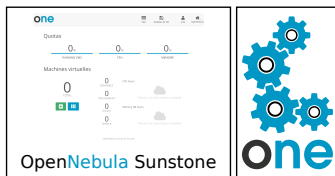
- Integrated on ISO
- Missing community feedback \Rightarrow tagged experimental

Several distributions depending on the working mode

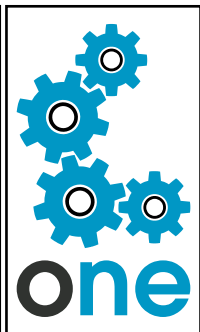
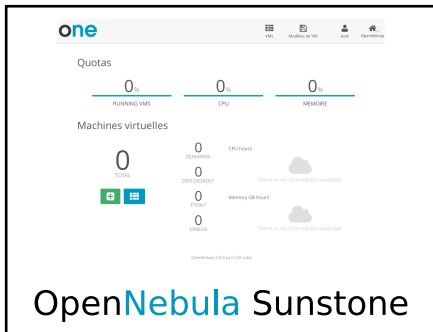
Single node server



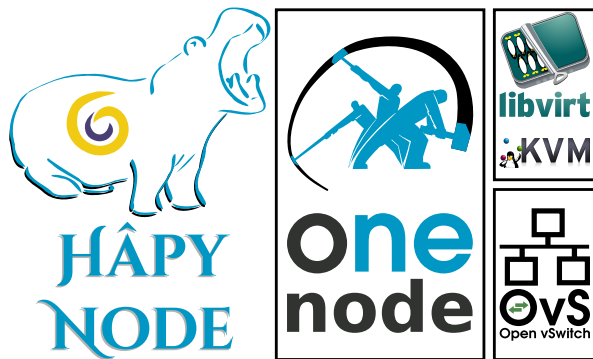
HÂPY



Cluster: the frontend



Cluster: the nodes

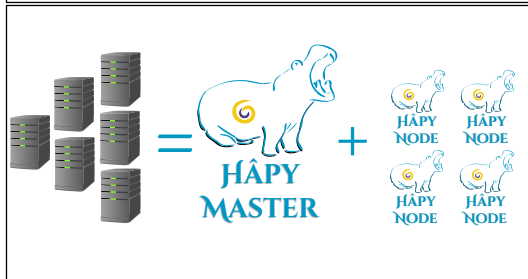
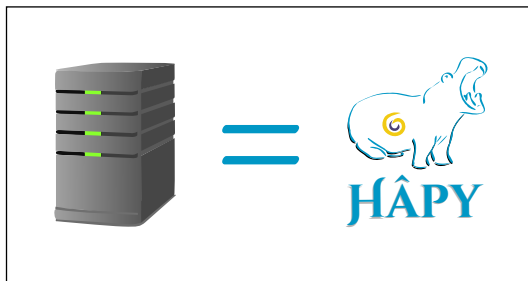


Hâpy deployment

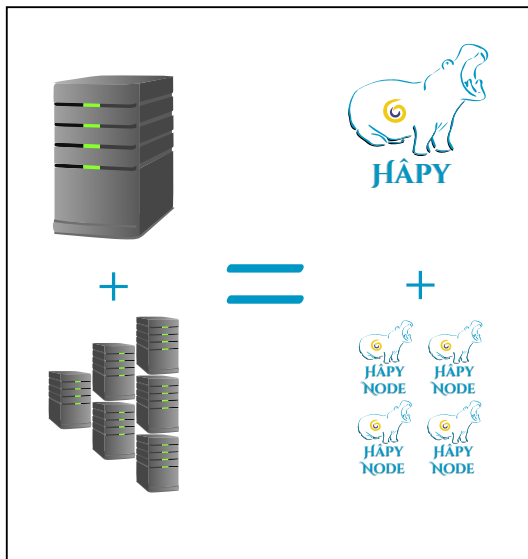
La Réunion is the hâpy leader

- 10 schools deployed
- 120 schools in 3 years
- 4 virtual machines per Hâpy (Amon, horus, 2 proprietary OS)
- 12 cores CPU, 64GB RAM, 1.2TB SAS internal disks
- 2TB for backup (VMs + ONE database)

Summary



Evolutivity



Outlook

- Integrate latest OpenNebula version
- Automatic migration of database on upgrade
- Use MySQL by default
- Support a distributed file system
- Better market support

Manage hundred of remote OpenNebula from a central console

Questions?

Thanks

Many thanks to the FOSS community for all the great software. So few things would exist without them.

This talk was realised with the help of the following libre software:

- Composition system \LaTeX [TeX Live](#)
- The most powerful text editor available today [GNU/Emacs](#)
- The [Awesome](#) window manager
- The Universal Operating System [Debian GNU/Linux](#)



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