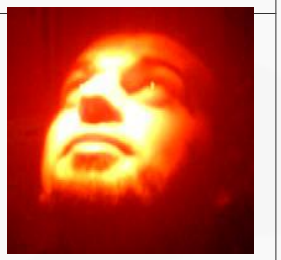
Who are we?

Iliyan “ILF” Stoyanov	Venelin “Venski” Gornishki
	
·A Linux-everywhere advocate since his first experience with the OS back in 1997 · Started work as a system administrator back in 2000, before he graduated high school ·Managed to survive stints in HP and the fast paced online bookmaker and online payment and money service industries, while still keeping his curiosity for technology ·Founded the tech start-up 'Evil Puppy' with his high-school classmate Venelin	·A programmer with “no-bullshit” attitude interested in all things “Apple” ·Fluent in Java, Objective-C, PHP, C++ ·Survived as a web, application and mobile devices programmer in few Bulgarian IT companies ·While at University of Leuven, did work that would be the basis of next gen e-signatures ·Joined Iliyan Stoyanov in the tech start-up 'Evil Puppy' where he is an equal equity partner.

The State of Things: Climate Change

- What is climate change?
- Why is it important?

(A brief walk-through of your bottom line)

Getting Political

- Why climate change got political?
  - The epic battle of left and right
- How could a leftist idea be a fiscally responsible one and why should your business care?

Enter the Cloud

- Public Clouds vs Private Clouds

  A story of infrastructure investments vs. infrastructure independance

Clouds and power consumption

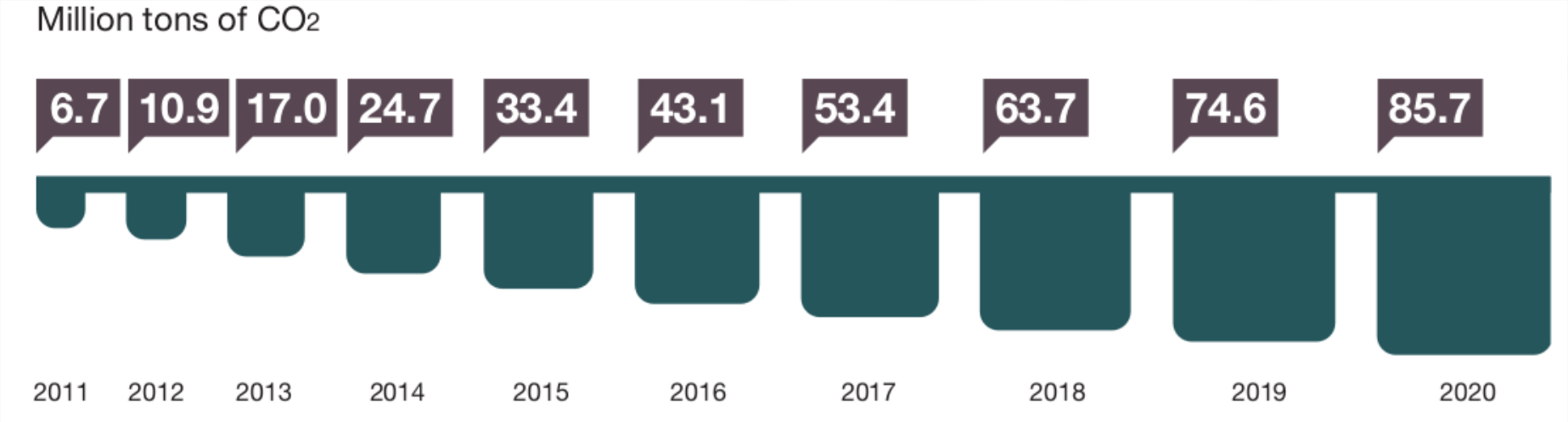
According to a Greenpeace study (take the projection with a grain of salt):

- In 2007 Public Cloud Computing consumed 632 billion kWh
- In 2020 Public Cloud Computing is projected to consume 1963 billion kWh or the equivalent of 1034 megatones of CO_2

Clouds and power consumption

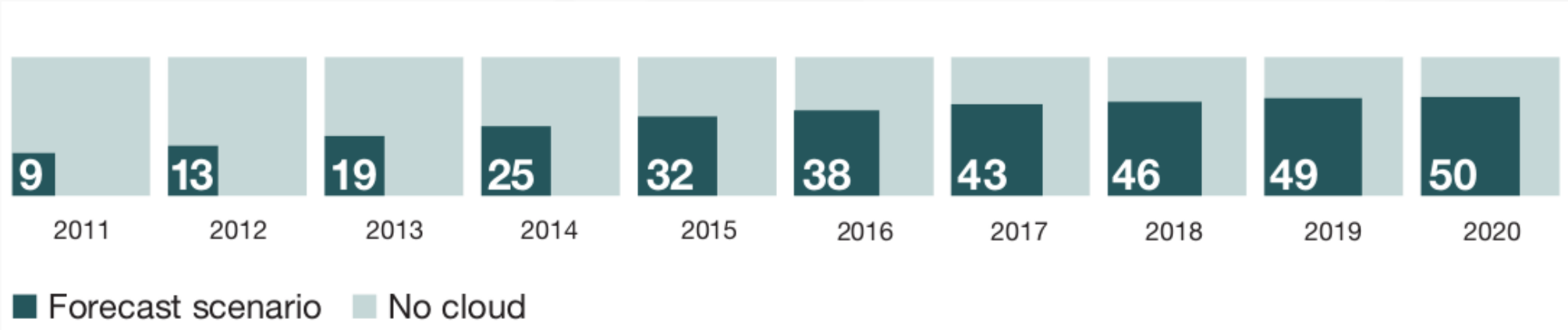
Yet, according to a study made by Verdantix (where Greenpeace stats were used):

- In 2011 the savings will amount to 6.7 million tons of CO_2, by 2014 they will reach ~25 mill tons

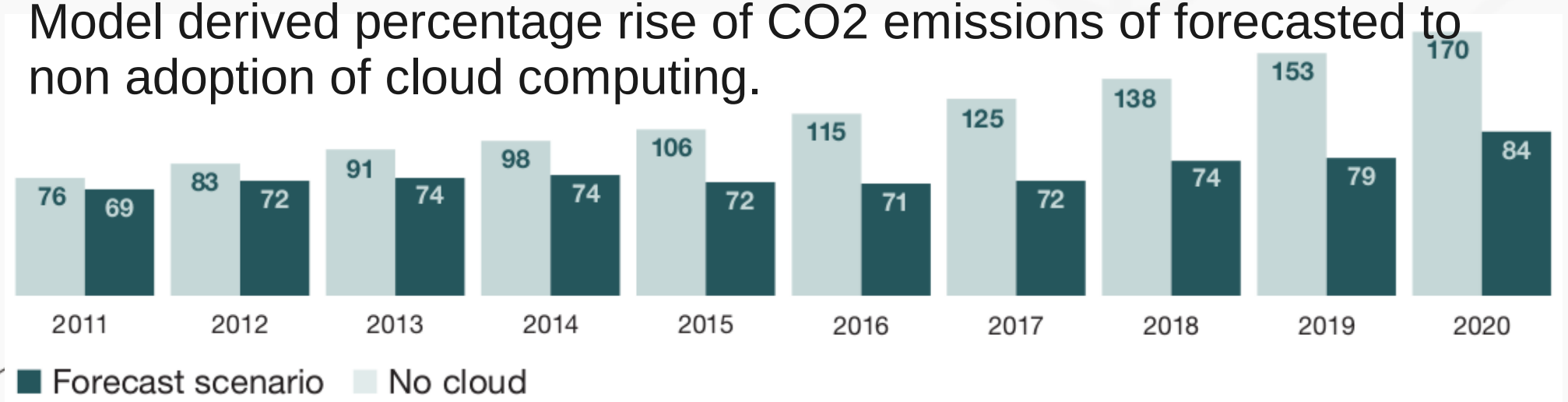


Clouds and power consumption

Model derived percentage CO2 savings of cloud computing compared to no cloud computing 2011-2020.



Model derived percentage rise of CO2 emissions of forecasted to non adoption of cloud computing.



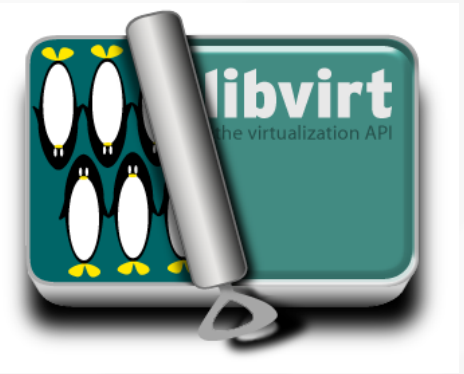
Enter OpenSource

(How and why should you build your own private cloud)

- The tools of the trade:
  - libvirt (libvirt.org) – The virtualization API:

    The Open Source Virtualization-Agnostic tool, that would help you build your open source cloud infrastructure

    - Supported containers and hypervisors
    - Network Capabilities
    - Storage back-end support
    - Nodes management and live virtual machine migration between hardware nodes



The tools of the trade:

- KVM – The Kernel Virtual Machine

  fully featured hypervisor with all the necessary “bells and whistles” to support AMD-V and Intel-VT
  - Industry backed – Red Hat, IBM, HP, Canonical, Novell, etc.
  - KVM supports all AMD/Intel Virtualization technologies including RVI/EPT, Direct Access to PCI (including PCI-E) hardware
  - Allows running of unmodified 32-bit and 64-bit guests – Linux, Windows, FreeBSD, OpenBSD, NetBSD, Solaris, QNX and even the x86 version of Android

The tools of the trade: KVM

- Includes para-virtualized Block Device and Network Device support (virt-io). Drivers for Windows, Linux, FreeBSD 9, NetBSD, DragonFlyBSD
- Allows for very aggressive use of system resources – over committing of memory and CPUs is a breeze and shines on NUMA systems
- At one case we achieved up to 250% higher density vs VMWare ESXi 4.1 thanks to some clever use of KSM (kernel SamePage Merging).
  - Dropped the use of 1 full blade enclosure = 8400W (Dell PowerEdge 1955)
  - And dropped the consumed power of another blade enclosure to ~2400W from ~3800W (HP BladeSystems c7000)

The tools of the trade:

“I have all these old Opteron servers circa 2005 and they do not support virtualization. Should I throw them out and invest in a new equipment?”

“Yes” and “No”

The tools of the trade: OS-level virtualization

Let the LXC drive your business forward

- lxc - Linux Containers

  virtual system mechanism that allows running multiple isolated Linux systems inside a Linux system host

  - No hypervisor, no overhead – OS guests run at almost 100% of bare-metal speed
  - Every container has it's own network space and process space thanks to linux control groups (cgroups)
  - lxc doesn't require hardware acceleration which makes is great on small and embedded systems – the best solution of some fringe server architectures like ARM and MIPS

The tools of the trade:

- No live migration of guests between hardware hosts
- You can run only Linux OSes inside the host. It is perfectly fine to run x86 and x86_64 Debian, Fedora, CentOS, Ubuntu guests over a x86_64 Arch host, for example, however you can't run *BSD, Windows or any other OS
- Truly open-source, community driven effort with no apparent industry support, although, there seems to be some Canonical backing

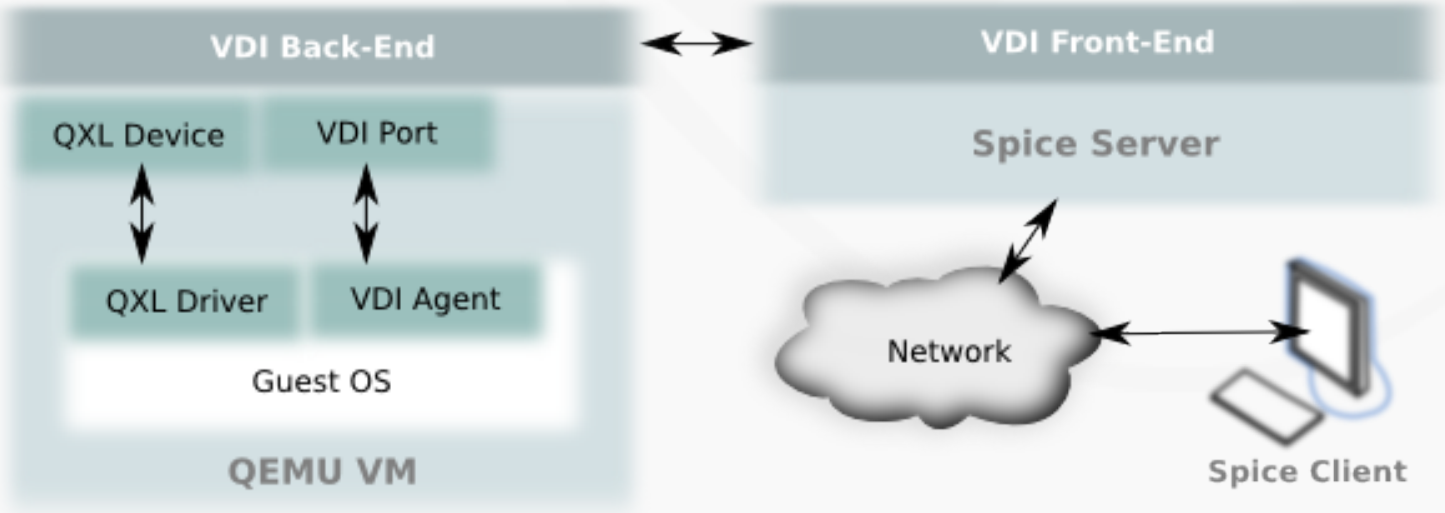
What's Next?

Virtualize everything!

and bring down energy consumption

"Get me some SPICE!"

- Virtualize your Open-Source Desktops
- Virtualize you Microsoft Desktops



What's Next?

Virtualize everything!

and bring down energy consumption

- Shorten your development and deployment cycle in the cloud

"Carbon reduction is one driver, but not the primary driver. The primary driver is time to market. Developers used to take 45 days to get new servers, but in our virtualized private cloud environment, it takes just a couple of minutes."

Paul Stemmler,

Citigroup

What's Next?

Scale-out

Crossing over to the Public cloud

- OpenStack
  - Developed by NASA and Rackspace, with the support of Canonical, Dell, HP, Intel, SuSE, AMD, Cisco, etc
  - Gives the ability of a company to turn it's Private Cloud to a Public One and provide IaaS to anyone
  - Completely Open Source (Apache License)
  - Modular Design

What's Next?

Scale-out

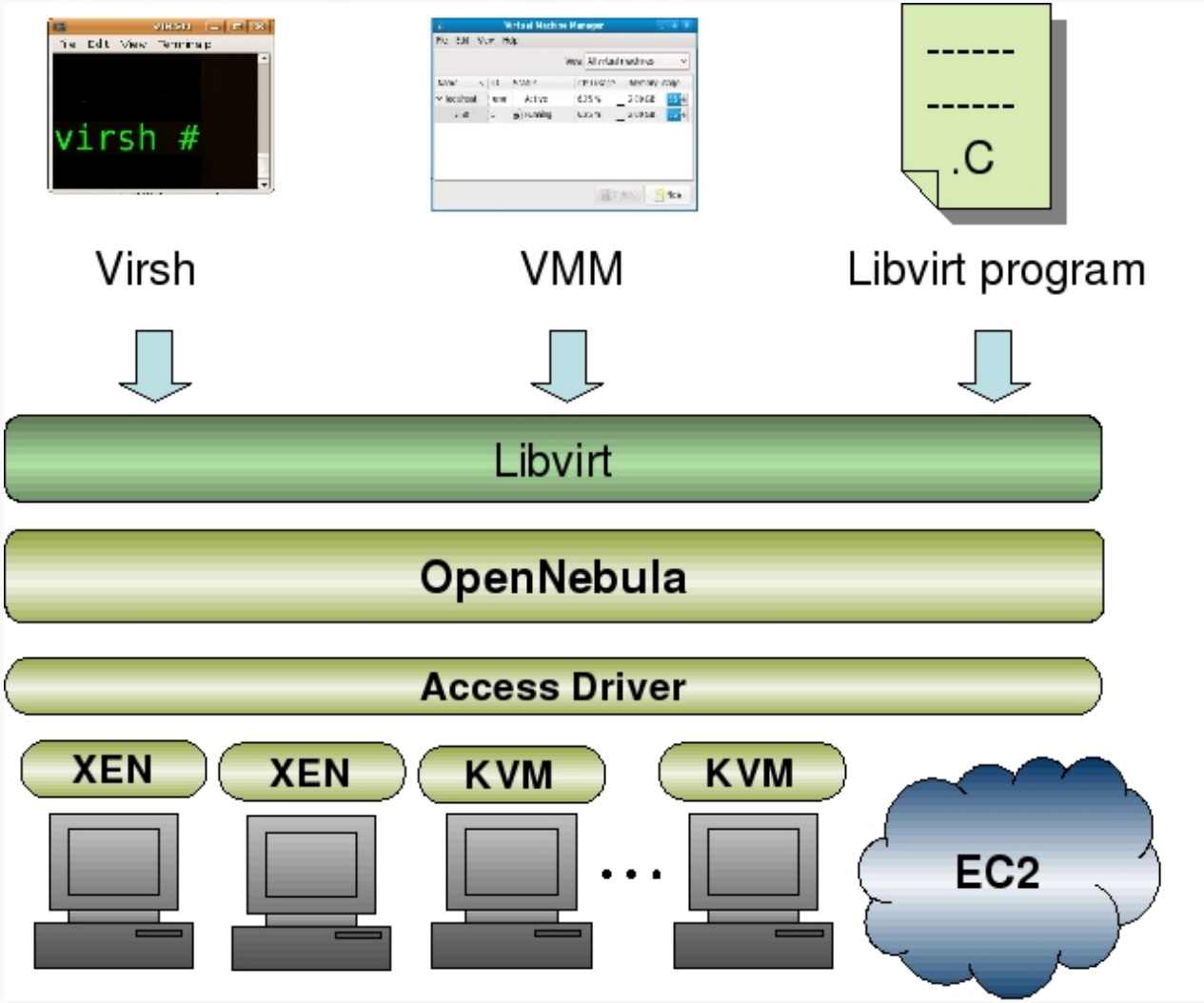
Crossing over to the Public cloud

- OpenNebula
  - Completely Open-Source (Apache License)
  - A lot of prominent users and contributors – KPMG, SARA, CERN, China Mobile, Telefonica
  - Gives the ability to turn Private Cloud to Iaas, but also to use Amazon's EC2 as a back-end of you Iaas infrastructure
  - Access drivers for KVM, Xen, VMWare and Amazon EC2 with a common libvirt interface

What's Next?

Scale-out

Crossing over to the Public cloud



Q&A*

*If we run out of time and you still have questions, find us around during the OpenFest and we'll be happy to answer your queries as best as we can