



Federating commercial IaaS

SURFnet IaaS cloud developments

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SURFnet & cloud



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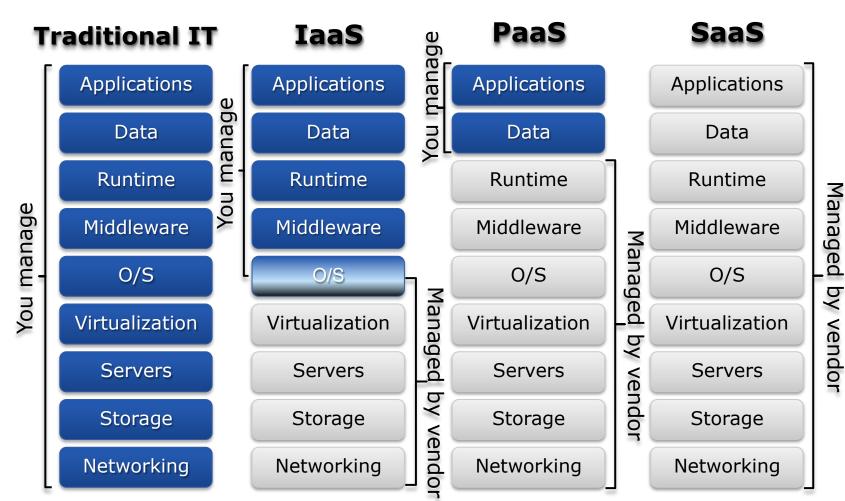
- Taskforce cloud
 Cloud-strategy
 Community cloud
- Experience with own infrastructure, services, public cloud providers
- Experiments with community IaaS
 - SURFnet provided
 - Commercial operator
- Green IT





Cloud spectrum



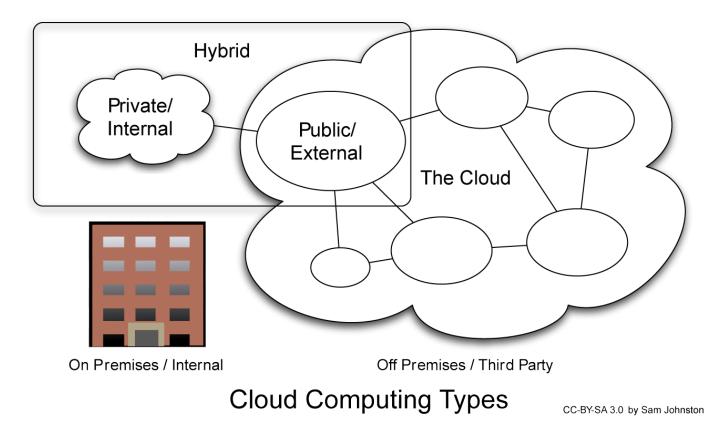


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Cloud deployment models





Community Cloud: external part (optimal, shared, made available) for specific usergroup



Community cloud drivers

- Demand for IaaS services

- Service improvement

- Ease of use
- Federated authentication
- No vendor lock-in

- Cost reduction

efficiency, procurement

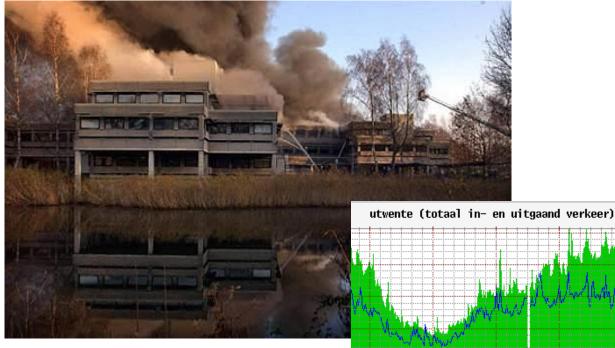
- Legal aspects
- Integration with network
- Emphasis on Green computing
- For full or hybrid use, disaster recovery, ...
- Customize to our community



SURFnet institutions and continuity



- This scared many in 2002:



- 12:00 18:00 00:00 06:00 00:00 06:00 In Uit 📕 Piek In 📃 In 🗖 Piek Uit 📕 Uit 206.41M 179.78M 110.90M 76.12M gemaakt op Wed Nov 20 10:45:40 2002
- It's still a "hot topic"

(But how do we ensure continuity best?)



IaaS pilots

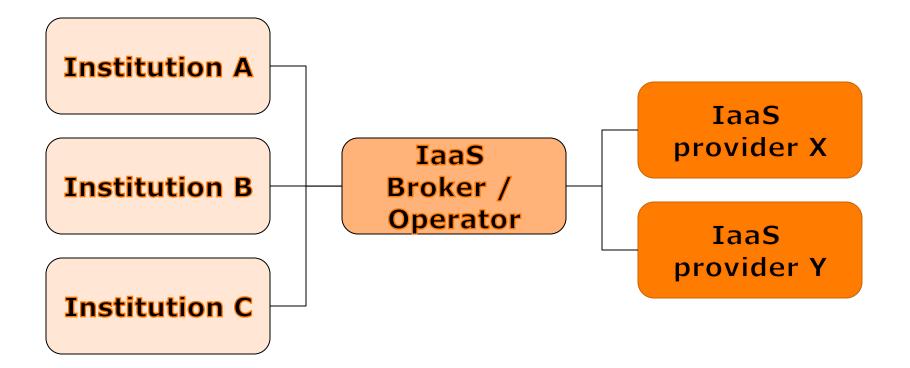


- Little commitment to use existing overcapacity (and legally complicated?)
- Pilot with institutions:
 - in the Netherlands:
 - VMware vCloud director
 - Use platform from GreenQloud
 - Commercial cloud outside Netherlands (GreenQloud)
 - Different characteristics / use-cases
 - Focus on Green,
 - energy, cooling, equipment
 - Network aspects (inter domain, latency)











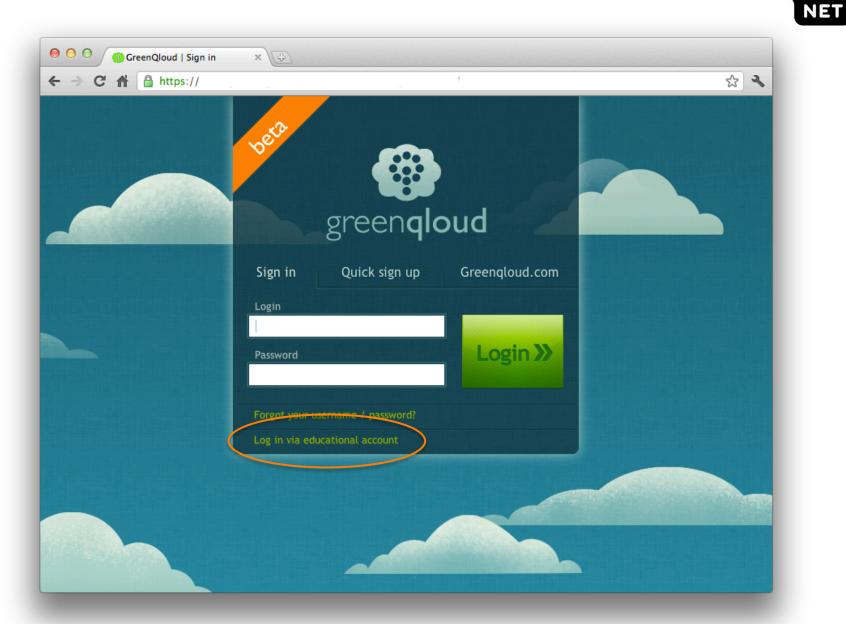
Ease of use SAML authentication



- SAML authentication in GreenQloud

- SURFnet (SURFfederatie)
- SUNET
- Run GreenQloud instance in the Netherlands
- SAML in open source
- Use groups, VOs (unique to our community?)
- Integrate in SURFconext gadget
- Use existing tools (GreenQloud is Amazon compatible)

SAML authentication



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GreenQloud, friendly portal

			NET
GreenQloud - The Truly Green	GreenQloud - The Truly Green® Compute Cl	loud	
greenqloud.com https://ma	anage.greenqloud.com/#	☆ ▼ C Google Q	
	Dashboard Instances Storage Network Support	Paul	l Dekkers
Instances: Lists all instances and live desktop views	Details Volumes Statistics	▶ Start Stop & Reboot ⊗ Destroy	Get Password
All Instances Create Instance			
test stopped test3 stopped centos2 Running tstopped test3 test3	test (i-5853fc4c) • Ubuntu Server 11.04 <u>i-46-149-17-199.compute.is-1.greenqloud.com</u> Service Offering: Nano (t1.nano) Created: 07/07/2011 10:15:50 Public Ip: <u>46.149.17.199</u> Private Ip: 10.1.1.49 Security Group: Group:		Support
fransradius Running Running Instances			
Stopped Instances			

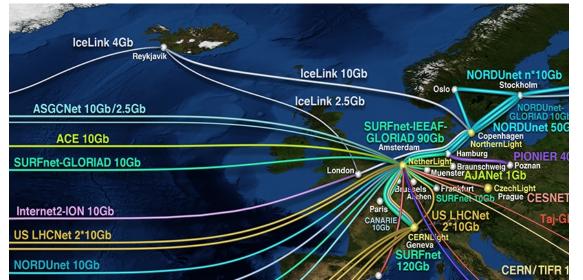
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Network integration

- Networking to commercial IaaS cloud
 - Via Netherlight, NORDUnet, ...
 - Use NREN-network capabilities (lightpaths)
 - Start machines behind own firewall?
 - Use NREN IP-space?
 - Reduce networking cost
 - Investigate latency impact

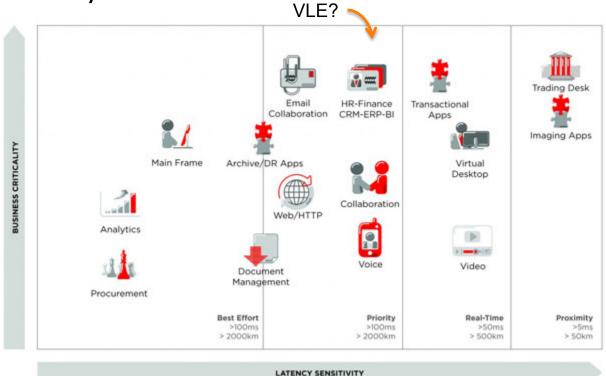




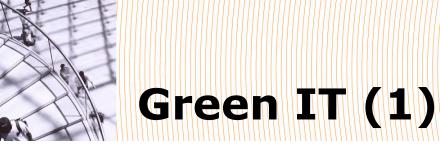
Influence on applications



- Applications run outside network, different firewall or behind own firewall
- Latency



graph from Equinix

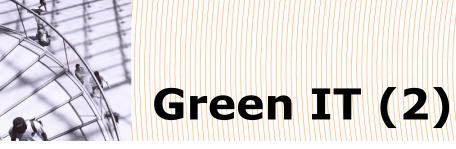




- Efficiency of cloud services (containers, pay-per-use stimulus)
- Power source / mix is important, not only about PUE

Energy source	g CO2/KWh
Wind	9
Hydroelectric	
reservoir	10
Wind	10
Biogas	П
Hydroelectric river	13
Solar thermal	13
Biomass	14
Solar PV	32
Geothermal	38
Nuclear	66
Natural gas	443
Diesel	778
Heavy oil	778
Coal	960
Coal no scrubbing	1050

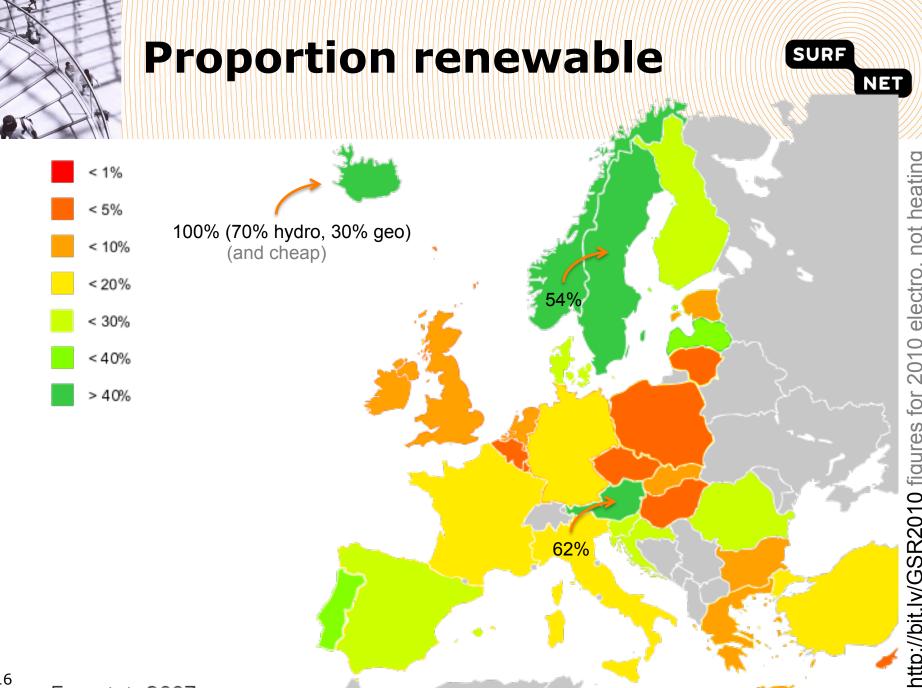






- GreenQloud's focus on Green (not just energy source)
- Use other countries strengths

Energy source Wind	g CO2/KWh 9	Ном	σ reen	is th	ne i	ndus	try with	GP	UF? greenglou
Hydroelectric reservoir	10		Sicci	G	PUEx		% Energy	Kg CO2/ KWh	Multipliers based on 2008 Sovacool surve
Wind	10	Google	Lenoir North Carolina	1,630	1,21	۱,97	50.5% Coal 38.7% Nuclear	0,76	GPUE
Biogas	11		Dalles		-		34.% Coal		Multipliers by energy source
Hydroelectric river	13		Oregon	1,490	١,2	1,79	34.% Coal 3.3% Nuclear	0,59	
Solar thermal	13	ć	Apple	1,630	<u>1,5</u>	2,44	50.5% Coal	0,94	Coal & Mixed x1.050
Biomass	14		North Carolina	1,030	<u></u>	2,77	38.7% Nuclear	0,77	Diesel & Heavy
Solar PV	32		Iceland	1,021	<u>1,1</u>	1,12	70% Hydro	0,02	Oil x0.778 Natural Gas
Geothermal	38			1,021	<u> </u>	1,12	30% GeoThermal	0,02	x0.443
Nuclear	66	Microsoft [.]	Chicago Illinois	1,819	1,22	2,22	72.8% Coal 22.3% Nuclear	١,00	Nuclear x0.066 Geothermal
Natural gas	443		San Antonio	1,936	١,2	2,32		1,12	x0.038
Diesel	778		Texas	1,750	1,2	2,32	37.1% Coal	1,12	Solar PV x0.032
Heavy oil	778	YAHOO!	Lockport New York	I,497	1,16	1,74	21.0% Coal 27.0% Nuclear	0,58	BioMass x0.014 Hydro x0.013
Coal	960	YAHOO	La Vista Nebraska	1,834	<u>1,5</u>	2,75	73.5% Coal	1,25	Wind x0.010
Coal no scrubbing	1050		TNEDLASKA				14.6% Nuclear		



http://bit.ly/GSR2010 figures for 2010 electro, not heating

GreenQloud (report on energy)

000	GreenQloud - The Truly Green® Compute Cloud	
GreenQloud - The Truly Green		
greenqloud.com https://manag	ge.greenqloud.com/	۹ 👜 🕈 💽
greenqloud	Dashboard Instances Storage Network Support	Paul Dekkers
Dashboard: An overview of your virtual infrastructure	Dashboard	
Getting started	Live statistics	
Pricing GreenQloud pricing	Graphs Key stats	
Start up a VM How to start up a new VM	Instance Load Instance Traffic SQ Traffic	i-1d7e8cec i-7f5d68ea i-e5c82d84
Create a bucket How to create a new Storage bucket	3%	ort
Using the API How to use the Greenqloud APIs	1 %	
Knowledge Base Common FAQs	0 % 16:06 19:40 23:13 2:46 6:20 9:53 13:26 17:00 20:33	0:06 3:40
Support Forums To the GreenQloud forums	Accumulated statistics This month This year total Since start This Week	
About GreenQloud About GreenQloud Technologies	0 Started VMs Total Number of VMs Started 1819 Requests Total requests to S3 5.37 GB Total storage GB Total storage used in all Greenqloud services 74.68 Data Out Total data downloaded from Greenqloud	51.70 Data In Total data uploaded to Greengloud
C Z N	Truly Green™ statistics Since start Estimated	
KI THE	53.5 KWh Energy used 982.0 g CO2 emitted The total CO2 emission since start 28.5 kg CO2 saved The total CO2 saved since start 0.07 Oil barrels Number of oil barrels saved since start	s Km in a car CO2 emission saved, measured in km driven in a regular car

SURF

European Economic Area Personal data must stay inside

Iceland = OK

Important for Dutch privacy law!

so... what about US suppliers...













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