

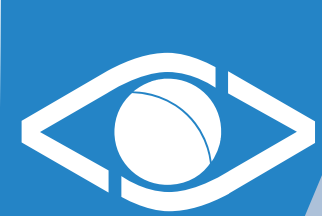


IPv6 at Swiss Cloud Providers

IPv6 Business Conference
16.6.2016 Zürich

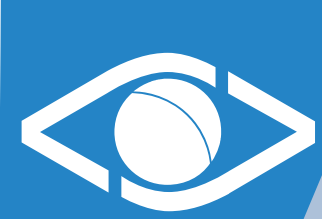
Aarno Aukia
VSHN AG - The DevOps Company





Agenda

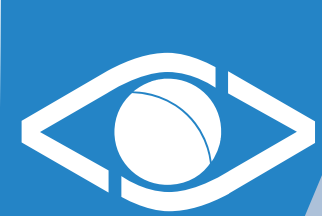
- About me
- What is Cloud: Defining SaaS/PaaS/IaaS
- How hard is it to add IPv6 after setting up the service?
- State of IPv6 at SaaS-providers
- State of IPv6 at PaaS-providers
- State of IPv6 at IaaS-providers
- Conclusion



About me

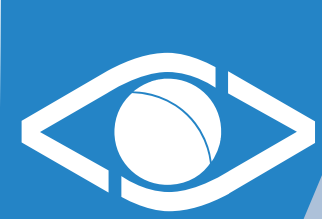
- MSc Computer Science ETH Zurich
- Security Operations @ Google
- Co-Founder & CTO @ Atrila GmbH (Security Operations)
- Co-Founder & CTO @ VSHN AG (DevOps & Cloud-Ops)

- @aarnoaukia
- <http://about.me/aarno>
- Aarno.aukia@vshn.ch
- Talk to me !



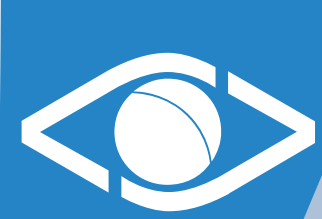
DevOps?

- Collaboration: Development (Dev) and Operations (Ops)
- Brings agile software engineering methods to operations
 - Automation: infrastructure as a code, versioning/rollback
 - Testing: continuous integration/testing/deployment
- Brings operations engineering experience to developers
 - Scalability: independent microservices
 - Production insight: monitoring/logging/metrics
- Together: make the business application owner happier



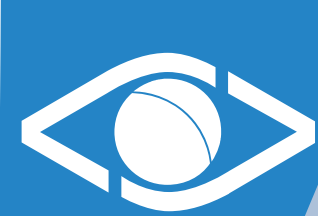
About VSHN

- Swiss DevOps & Ops Company, 17 people in Zurich
- Building the tools and workflows for self-service
- Managing web applications in any Cloud
 - We are cloud-agnostic: we run on any public Cloud and on any on-premises Enterprise private Cloud
- We work for Amazee Labs, Liip, Mercedes Benz Switzerland, Migros, SaltCinema, SIX Group, Sherpany, Sobrado, Starticket, Suisa, Taskfleet, zurichopenair.ch, etc.



What is Cloud ?

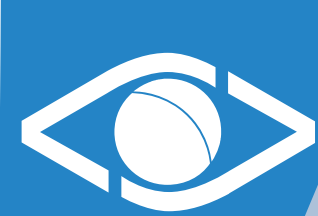
- Shared computing service ordered, provisioned and used online over the internet
- Software as a Service (SaaS): online application providing business value
- Plattform as a Service (PaaS): hosted software framework for developing applications
- Infrastructure as a Service (IaaS): virtual servers consisting of compute, storage and network



Compare SaaS/PaaS/IaaS

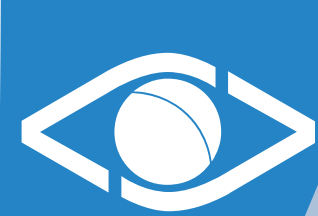
On-premises	IaaS Infrastructure as a Service	PaaS Plattform as a Service	SaaS Software as a Service
License	License	License	License
Application	Application	Application	Application
Runtime	Runtime	Runtime	Runtime
Security	Security	Security	Security
Databases	Databases	Databases	Databases
Operating System	Operating System	Operating System	Operating System
Virtualization	Virtualization	Virtualization	Virtualization
Server Hardware	Server Hardware	Server Hardware	Server Hardware
Storage	Storage	Storage	Storage
Networking	Networking	Networking	Networking
Datacenter	Datacenter	Datacenter	Datacenter

Customer managed	Service provider
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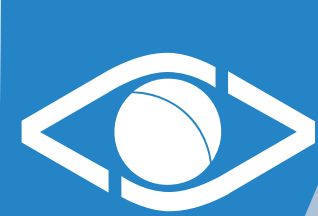
Compare SaaS/PaaS/IaaS - Pizza edition

On-premises	IaaS	PaaS	SaaS
Dining Table	Dining Table	Dining Table	Dining Table
Beverage	Beverage	Beverage	Beverage
Electric/Gas usage	Electric/Gas usage	Electric/Gas usage	Electric/Gas usage
Oven	Oven	Oven	Oven
Toppings	Toppings	Toppings	Toppings
Cheese	Cheese	Cheese	Cheese
Tomato Sauce	Tomato Sauce	Tomato Sauce	Tomato Sauce
Pizza Dough	Pizza Dough	Pizza Dough	Pizza Dough
Made at home	Take & Bake	Pizza delivery	Pizzeria restaurant



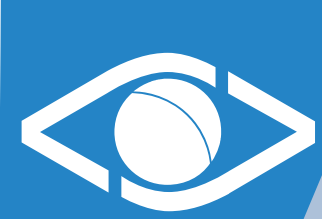
Compare SaaS/PaaS/IaaS - Car edition

On-premises	IaaS	PaaS	SaaS
Driver	Driver	Driver	Driver
Road Tolls	Road Tolls	Road Tolls	Road Tolls
Fuel	Fuel	Fuel	Fuel
Garage	Garage	Garage	Garage
Tax & Insurance	Tax & Insurance	Tax & Insurance	Tax & Insurance
Service & Materials	Service & Materials	Service & Materials	Service & Materials
Finance & Depreciation	Finance & Depreciation	Finance & Depreciation	Finance & Depreciation
Car	Car	Car	Car
Car owned	Car leased	Car rental	Taxi, bus, train, airplane



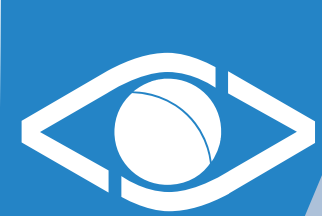
Compare SaaS/PaaS/IaaS - OSI edition

OSI	Name	Example	IaaS	PaaS	SaaS
7	Application Layer	HTTP, HTML, SMTP, ...	HTTP	HTTP	HTTP
6	Presentation Layer	SSL, jpg, png	SSL	SSL	SSL
5	Session Layer	Socket, pipe, rpc	Socket	Socket	Socket
4	Transport Layer	TCP, UDP	TCP	TCP	TCP
3	Network Layer	IPv4, IPv6	IPv4/6	IPv4/6	IPv4/6
2	Data Link Layer	Ethernet CDMA, ARP	Ethernet	Ethernet	Ethernet
1	Physical Layer	Copper Ethernet, Fibre Ethernet	Copper, Fibre	Copper, Fibre	Copper, Fibre



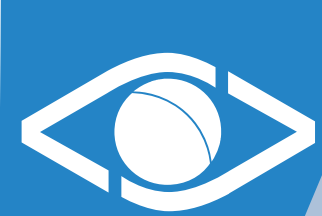
How hard is it to enable IPv6 ?

- SaaS: usually accessed over provider URL
 - <https://service.com>
 - Service provider can add IPv6 at his discretion
 - No changes needed by customer
- Customer can't influence IPv6 implementation by provider
 - If customer suddenly needs IPv6 → change providers



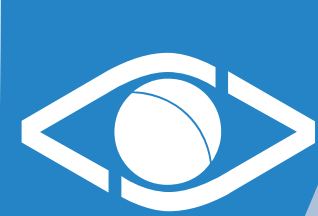
How hard is it to enable IPv6 ?

- PaaS: usually accessed over customer URL
 - `https://customer.com`
 - Usually done with DNS CNAME → service provider can add IPv6 at his discretion
 - Customer application needs to be changed if hardcoded to use client IPv4 address
- Customer can't influence IPv6 implementation by provider
 - If customer suddenly needs IPv6 → change providers



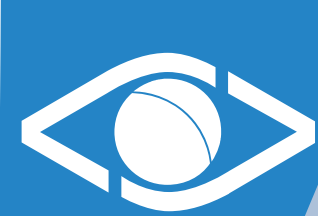
How hard is it to enable IPv6 ?

- IaaS:
 - Reconfigure each server and load-balancer to add IPv6
 - change internal service discovery (DNS/AD)
 - Customer application needs to be changed if hardcoded to use client IPv4 address
- Customer can't influence IPv6 implementation by provider
 - If customer suddenly needs IPv6 → change providers



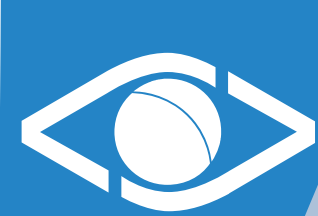
State of IPv6 at SaaS-providers

Service	Status	Comments
http://doodle.com	OK	Since 2011
https://mail.google.com	OK	All Google applications since 2012
http://office365.com	OK	Sharepoint & Skype opt-in
http://sobrado.ch	OK	
http://starticket.ch	OK	
http://local.ch	OK	
http://www.zh.ch	OK	
http://www.securesafe.com	NO	
http://swisscloudcomputing.com	NO	Planned for 2017
Etc. see http://dashboard.swissipv6council.ch/		



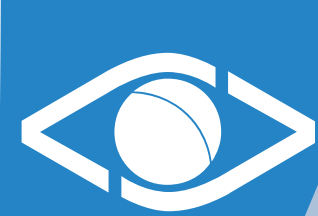
State of IPv6 at PaaS-providers

Service	Status	Comments
http://cyon.ch	NO	Planned
http://flow.ch	NO	Planned
http://hostpoint.ch	NO	
http://metanet.ch	NO	
http://switchplus.ch	NO	
https://azure.microsoft.com/	NO	
https://aws.amazon.com/	NO	
http://heroku.com	NO	
Swisscom App Cloud	NO	



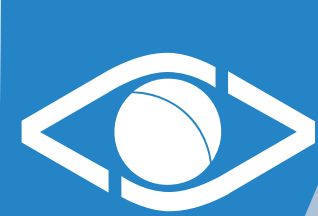
State of IPv6 at PaaS-providers - 2

Service	Status	Comments
http://appuio.ch	OK	
https://cloud.google.com/appengine/	OK	
http://iway.ch	OK	



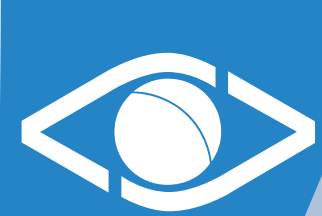
State of IPv6 at IaaS-providers - 1

Service	Status	Comments
https://azure.microsoft.com/	NO	
https://cloud.google.com/compute/	NO	
http://everyware.ch	NO	
http://innofield.ch	NO	Planned
http://exoscale.ch	NO	Planned End 2016
http://cloudsigma.ch	NO	
http://safeswisscloud.ch	NO	Planned End 2016
Swisscom Enterprise Cloud	NO	
http://4net.ch	NO	



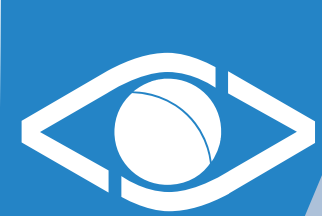
State of IPv6 at IaaS-providers - 2

Service	Status	Comments
https://aws.amazon.com/	LB	Public load balancers only
http://procloud.ch	OK	No customers are using it, only IPv4 used internally
http://aspectra.ch	OK	Opt-in
http://cloudscale.ch	OK	
http://metanet.ch	OK	Opt-in
http://nexellent.ch	OK	Opt-in
http://avectris.ch	OK	Opt-in, currently only DNS deployed
http://iway.ch	OK	
http://nine.ch	OK	
http://digitalocean.com	OK	
http://linode.com	OK	
http://rackspace.com	OK	
https://www.switch.ch/engines/	OK	CH-Edu customers only



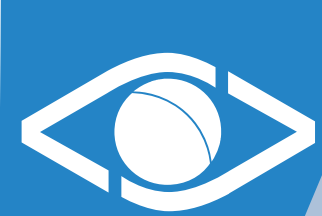
State of IPv6 at (swiss) cloud providers

- Many (swiss) cloud providers support IPv6 natively and by default
- If you are committing to a provider for 1+ years you need to require IPv6 in the tender/contract
 - Neglect will be costly later on any service
- CEO of swiss IPv4-only Hosting provider:
 - 'Wir bieten shared Webhosting (Bezug von DomainFactory.de) und Mailhosting (Bezug von Green.ch) an. [...] Generell gehen wir davon aus, dass unsere Anbieter State-of-the-art Technologie einsetzen.'



Risks due to missing IPv6

- Customer bears cost to configure/migrate to IPv6 if not specified in contract beforehand
- SaaS: communication over IPv6 may be impossible or performance impacted due to CGN (LinkedIn, Facebook)
- PaaS: your investment in adapting your software to the PaaS needs to be written off if you need to migrate
- IaaS
 - You can't access external APIs over IPv6
 - Your public service can't be accessed over IPv6 or performance may be impacted due to CGN
 - Long-term-contracts and implementation effort increase amount of potential write-off



Conclusion

- IPv6 needs to be a procurement requirement for cloud services as well as for hardware, application/software or ISP/internet access services
- Long-term-contracts without IPv6 are risky
- Choose an cloud-provider that supports IPv6 now because the migration effort later will be huge !
- No roadmap = no future

- Questions ?
- Thank you - please get in touch if you have questions later !

Thanks to all our Sponsors

