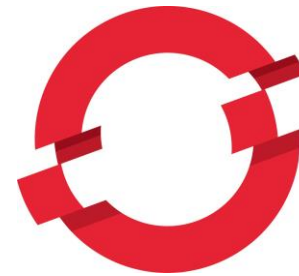


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# Introduktion til OpenShift / Redhat

TROELS HANSEN



**RED HAT**<sup>®</sup>  
**OPENSHIFT**  
Container Platform

# Agenda

- ▶ Kort om mig
- ▶ Intro til Red Hat
- ▶ Hvorfor OpenShift?
- ▶ Hvad er OpenShift

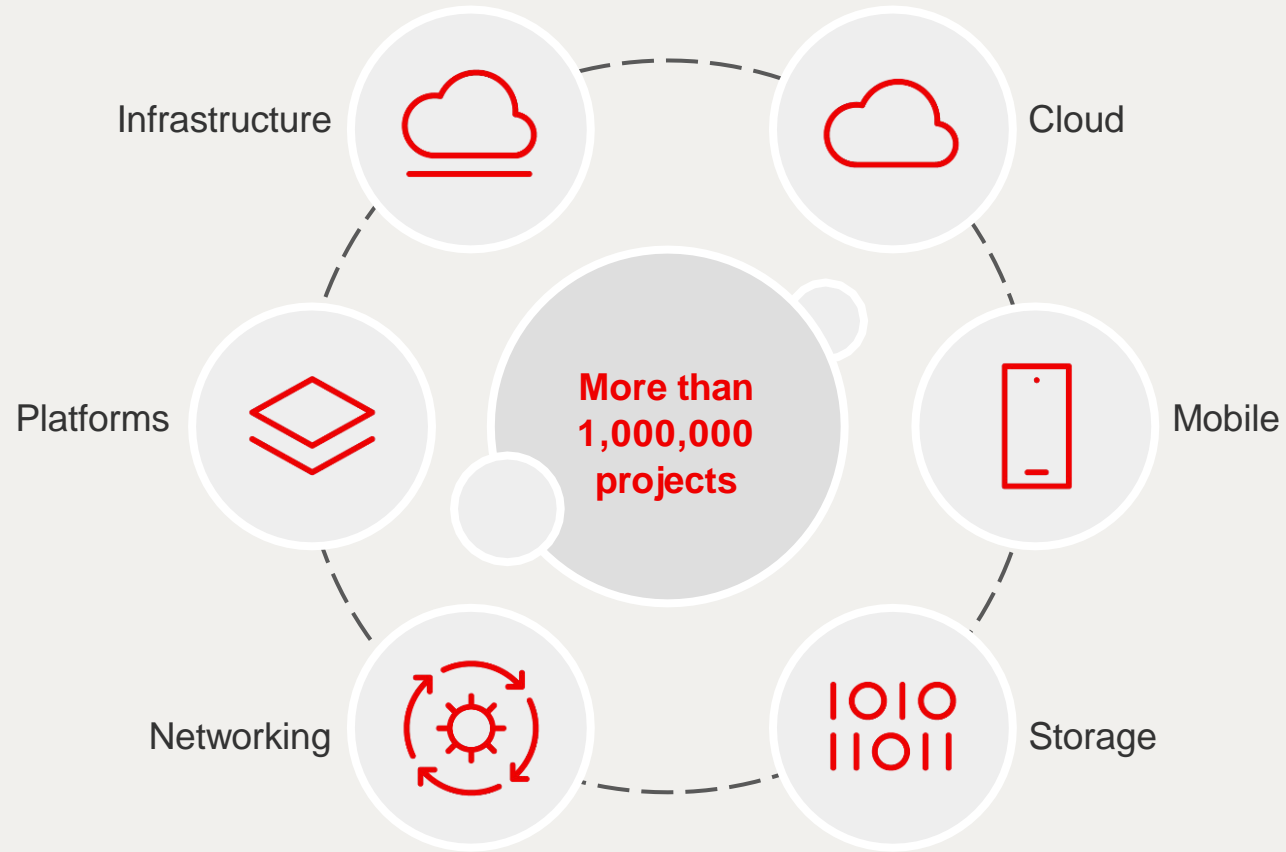
# Troels Hansen

- ▶ Casalogic: 2006 – 2018
- ▶ Aperta: 2019
- ▶ Miracle: 2019 - 2022
- ▶ Knowit: 2022 – 2023

Altid som Red Hat partner

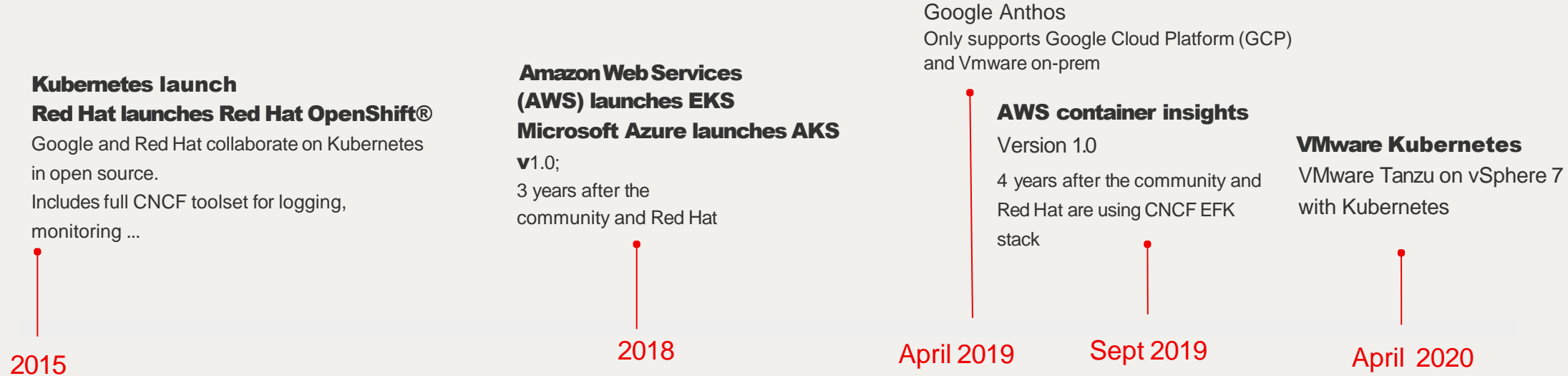
Red Hat er et enterprise software  
virksomhed med en  
**open source**  
udviklingsmodel

# Open source fuels rapid innovation



# Red Hat leads Kubernetes development from the start

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5+ years of enterprise  
Kubernetes leadership

## Red Hat OpenShift

Kubernetes, developer services, operators, serverless, service mesh,  
container-optimized Linux operating system



Edge



Physical



Virtual



Private cloud



Public cloud



Managed cloud

(Azure, AWS, IBM, Red Hat)

# Why OpenShift?

# The Cloud Native App Dev Challenge

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CNCF Cloud Native Landscape  
2020-06-04T21:40:43Z 3d5131c

Overwhelmed? Please see the CNCF Trail Map. That and the interactive landscape are at [l.cncf.io](https://l.cncf.io)

Greyed logos are not open source

App Definition and Development

Database: Vitess, KV, CockroachDB, YugabyteDB, TiDB, etc.

Streaming & Messaging: cloudevents, NATS, etc.

Application Definition & Image Build: HELM, K8S, etc.

Continuous Integration & Delivery: argo, BRIGADE, etc.

Orchestration & Management

Scheduling & Orchestration: kubernetes, Nomad, etc.

Coordination & Service Discovery: CoreDNS, etcd, etc.

Remote Procedure Call: gRPC, etc.

Service Proxy: envoy, etc.

API Gateway: Kong, etc.

Service Mesh: LINKERD, etc.

Runtime

Cloud Native Storage: Rook, etc.

Container Runtime: cri-o, etc.

Cloud Native Network: CNI, etc.

Provisioning

Automation & Configuration: Ansible, etc.

Container Registry: Dragonfly, Harbor, etc.

Security & Compliance: Falco, etc.

Key Management: Athenz, etc.

Kubernetes Certified Service Provider

Kubernetes Training Partner

## Platform

Certified Kubernetes - Distribution: agola, BRIGADE, etc.

Certified Kubernetes - Hosted: AWS, Azure, etc.

Certified Kubernetes - Installer: Kubekins, etc.

PaaS/Container Service: Flynn, etc.

## Observability and Analysis

Monitoring: Prometheus, Grafana, etc.

Logging: fluentd, ELK, etc.

Tracing: Jaeger, etc.

Chaos Engineering: Gremlin, etc.

## Serverless

Serverless interactive display at [l.cncf.io](https://l.cncf.io)



# The Cloud Native App Dev Challenge

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September 2024

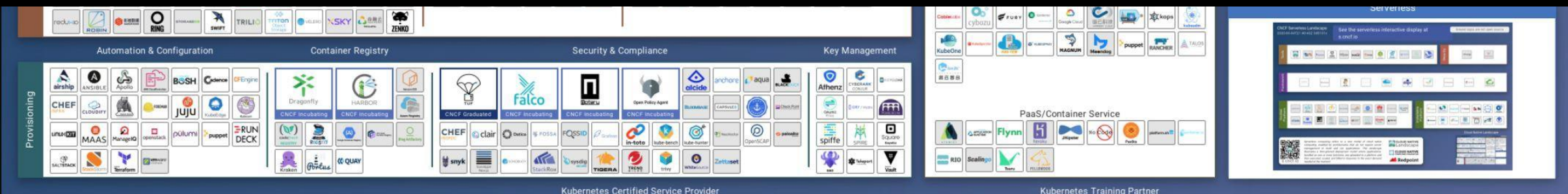
App Definition and Development	Application Definition & Image Build	Database	Continuous Integration & Delivery	Streaming & Messaging
Orchestration & Management	Scheduling & Orchestration	Service Mesh	Remote Procedure Call	
Runtime	Service Proxy	API Gateway	Coordination & Service Discovery	
Provisioning	Cloud Native Storage	Cloud Native Network	Container Runtime	
Observability and Analysis	Security & Compliance	Automation & Configuration	Container Registry	Key Management
Observability and Analysis	Observability	Continuous Optimization	Chaos Engine...	Feature Flagging

# The Cloud Native App Dev Challenge

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# Red Hat tests and validates components of the whole stack for you



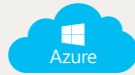
# OpenShift offers the broadest set of hybrid cloud services

**Developer Efficiency**

**Business Productivity**

**Enterprise Ready**

## Red Hat OpenShift



On-premises

Amazon Red Hat  
OpenShift

AMRO

Azure Red Hat  
OpenShift

ARO

Red Hat OpenShift on  
IBM Cloud

ROKS

Red Hat OpenShift  
Dedicated

OSD

OpenShift Container  
Platform

OCP

Joint offerings with Cloud Provider

Red Hat Managed

Customer Managed  
OCP

Offered as a Native Console offering on equal parity with cloud provider  
Kubernetes service

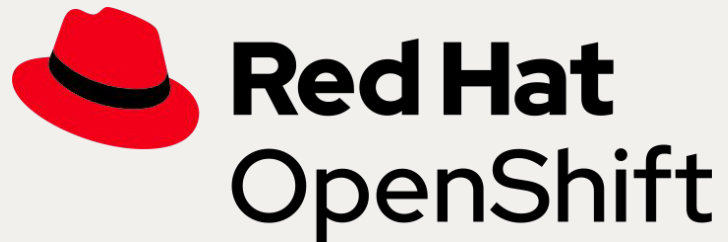
or

Customer Managed OCP

# So what is OpenShift?

# A single open platform for application innovation

A complete DevSecOps platform that integrates with existing infrastructure, tools, and services



## Empowering developers to innovate

Get applications to production sooner with a wide range of technologies and streamlined workflows

## A cloud-like experience, everywhere

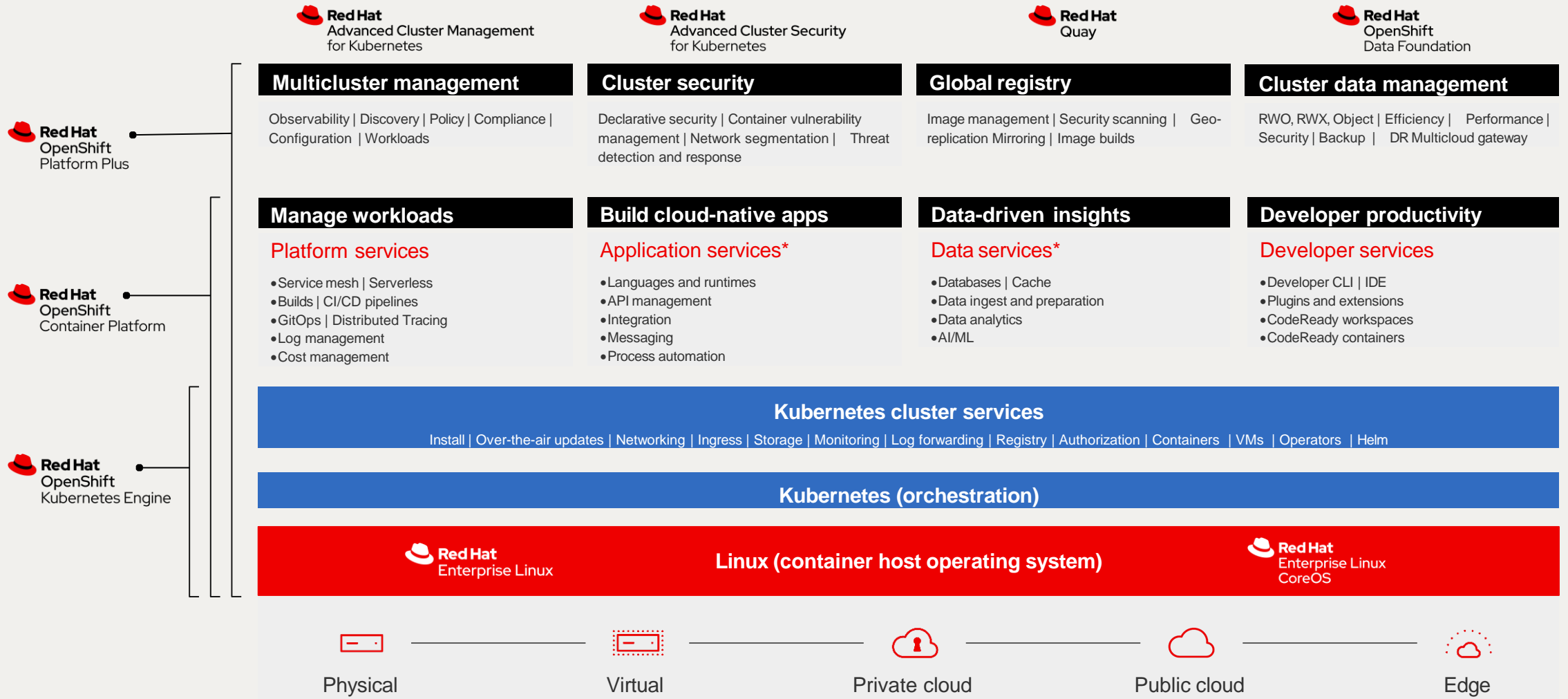
Full-stack and automated operations on a consistent foundation for on-premises or hybrid cloud infrastructures

## Trusted enterprise Kubernetes

Continuous security, world-class support and services, and deep expertise to confidently run any application

# Red Hat open hybrid cloud platform

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\* Red Hat OpenShift® includes supported runtimes for popular languages/frameworks/databases. Additional capabilities listed are from the Red Hat Application Services and Red Hat Data Services portfolios.

\*\* Disaster recovery, volume and multicloud encryption, key management service, and support for multiple clusters and off-cluster workloads requires OpenShift Data Foundation Advanced

# Why Red Hat Enterprise Linux CoreOS?

- Automatic updates
  - No interaction for administrators
  - Staying up to date → security fixes applied
- Centrally configured infrastructure
  - Need a change? Update configs and re-provision.
- User software runs in containers
  - Host updates are more reliable

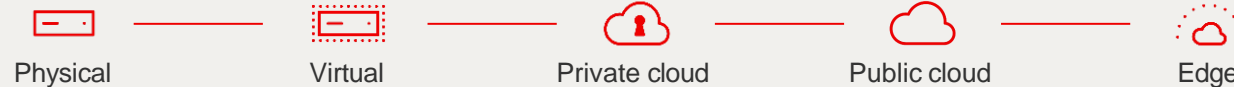


## RED HAT® ENTERPRISE LINUX CoreOS

### An operating system for containers

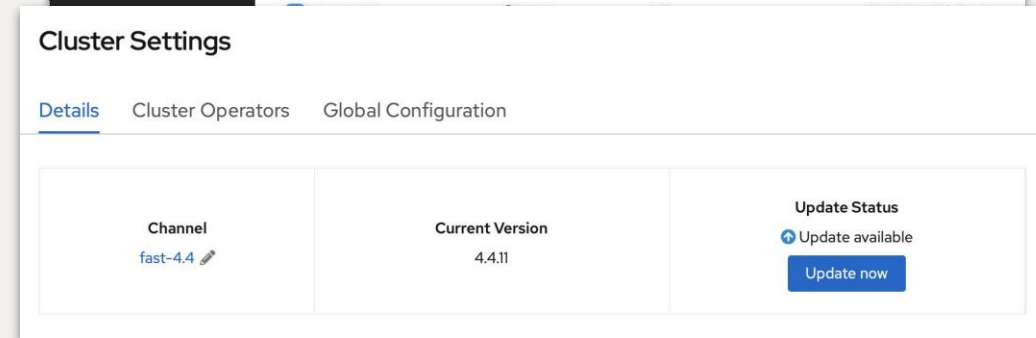
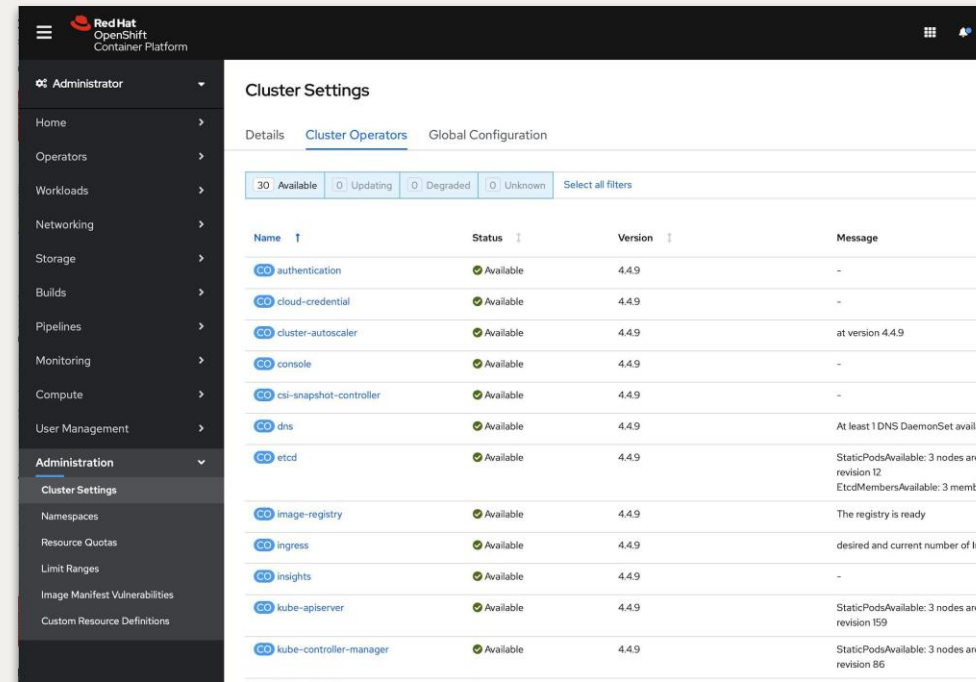
- Container based packaging
- Kubernetes cluster based management
- Delivered and updated with OpenShift
- Industry standard RHEL security & compliance
- Certified Red Hat Container ISV ecosystem

### Linux (container host OS)



# Each OpenShift release is a collection of Operators

- 100% automated, in-place upgrade process
- 30 Operators run every major part of the platform:
  - Console, Monitoring, Authentication, Machine management, Kubernetes Control Plane, etcd, DNS, and more.
- Operators constantly strive to meet the desired state, merging admin config and Red Hat recommendations
- CI testing is constantly running install, upgrade and stress tests against groups of Operators





# Bring traditional VMs into OpenShift

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## Traditional VM behavior in a modern platform

- ▶ Administrator concepts and actions
- ▶ Network connectivity
- ▶ Live migration

## Leverage existing VM roles and responsibilities

- ▶ Maintain business critical application components
- ▶ Modernize skill sets over time

## Migration Tooling

- ▶ **Migration Toolkit for Virtualization** (MTV)
- ▶ Warm migration of VMs at scale

**Create Migration Plan**

**Select VMs**

Select VMs for migration. The Migration analysis column shows the risk associated with migrating a VM as determined by Red Hat's Migration Analytics service. The Flags indicate the reason for that risk assessment.

<input type="checkbox"/>	Migration analysis	VM name	Datacenter	Cluster	Host	Folder path
<input type="checkbox"/>	⚠	VM1	datacenter1	cluster1	host1	folder1/folder2
<input type="checkbox"/>	✓	VM2	datacenter1	cluster1	host1	folder1/folder2
<input type="checkbox"/>	i	VM3	datacenter1	cluster1	host1	folder1/folder2
<input type="checkbox"/>	✓	VM4	datacenter1	cluster1	host1	folder1/folder2
<input type="checkbox"/>	⚠	VM5	datacenter1	cluster1	host1	folder1/folder2

This VM is a **high risk** for migration because it violates the following rules:

- VM shares a disk with other VMs
- VM uses remote device management
- VM was harvested during a month without an "r" in it

Creating a migration plan with MTV

# Develop, Deploy & Connect Cloud Native Applications

knowit

## App Runtimes & Frameworks

- ▶ Quarkus & Spring Boot
- ▶ In-memory, distributed, NoSQL datastore
- ▶ Web server
- ▶ Node.js

## Microservices & APIs

- ▶ API Manager
- ▶ API Gateway
- ▶ API Designer
- ▶ Service Registry
- ▶ Istio Service Mesh Extension

## Events & Messaging

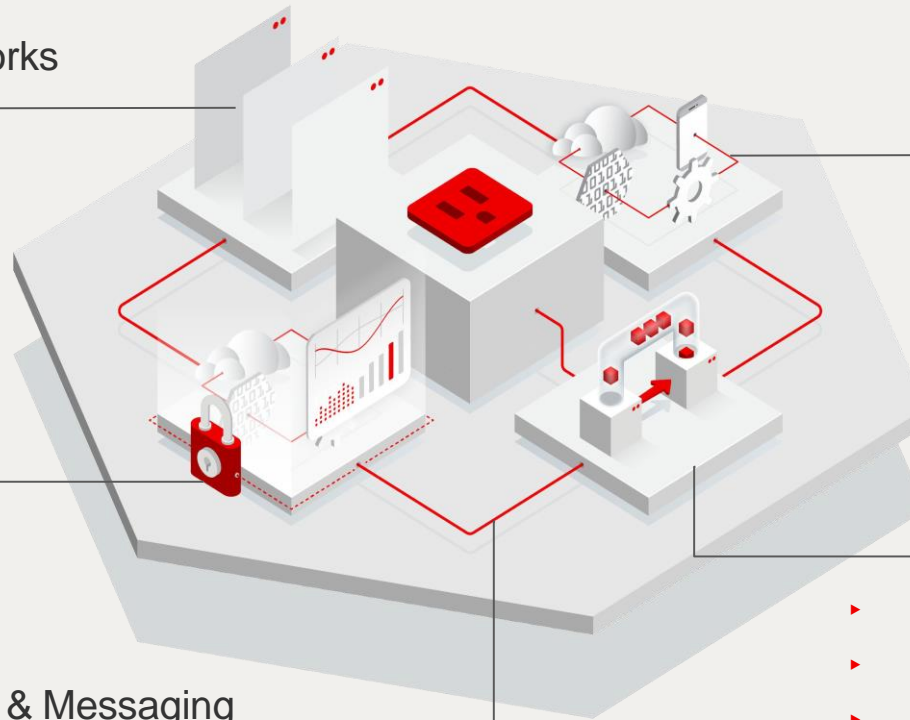
- ▶ JMS Message Broker
- ▶ Wide Area Routing
- ▶ Data Streaming with Apache Kafka
- ▶ Change Data Capture with Debezium

## Serverless & Integration

- ▶ Comprehensive connectors
- ▶ Microservices orchestration
- ▶ Data Transformation
- ▶ Serverless deployments\*

## DevSecOps & Tooling

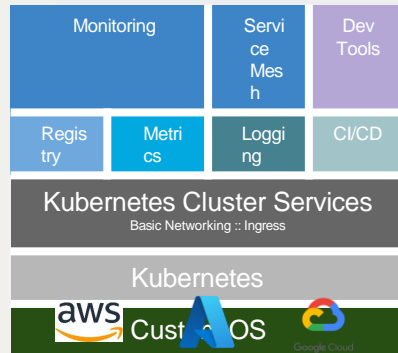
- ▶ Single Sign On
- ▶ Pipelines and GitOps\*
- ▶ Service Mesh\*
- ▶ Migration ToolKit for Apps
- ▶ Integrated Development Environment (IDE)\*



# Build and run a platform *versus* using a turnkey cloud service



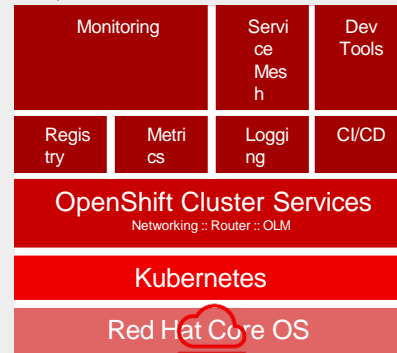
The Parts



**xKS + 'native' services**



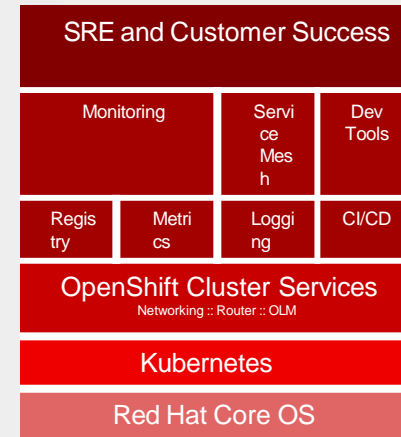
The Assembled Car



**- Application Platform - Self-managed Red Hat OpenShift**



The Car & Pit Crew



**- Turnkey Application Platform - Red Hat OpenShift cloud services**

**“Batteries Included”**

...but swappable

Individual components can be swapped out

Eg.

- Using Azure Log Insights
- Use specific cloud services or ISV offerings

# Hvordan kan vi hjælpe jer.....

	I gør det selv	Vi gør det sammen	Vi klarer det hele
<b>OpenShift</b>			
- Arkitekturmøde om platformen	✓	✓	✓
- Installation af OpenShift	✓	✓	✓
- Tuning af OpenShift		✓	✓
<b>SAS</b>			
- Installation af SAS	✓	✓	✓
- Oprettelse af brugere i SAS		✓	✓
- Basal tuning af SAS		✓	✓
<b>Undervisning</b>			
- 1 dags gennemgang af OpenShift og SAS platformen		✓	
- 2 dages gennemgang og undervisning			✓
- Mulighed for individuelt planlagt træning			✓
<b>Support til driftplatformen</b>			
- Tid inkluderet til platformsupport, pr måned	2	4	∞
- Platformsansvarlig			✓
<b>Supportmuligheder</b>			
- Telefonsupport	✓		✓
- Support via Email		✓	✓
- Adgang til servicedesk			✓
- Mulighed for at tilkøbe 24-7 support			✓
<b>Statusmøder</b>			
Månedligt			✓
<b>Reaktionstid</b>			
8-17, mandag - fredag	8 timer	5 timer	3 timer
<b>Managed services</b>			
- Overvågning af OpenShift platformen			✓
- Månedlig patchning af OpenShift			✓
- Kvartalsvis patchning af SAS (LTS)			✓
- Mulighed for månedlig patchning (Stable)			✓



**Troels Hansen**

Open Source Arkitekt



**Knowit**

Nyropsgade 41, 1602 København

Phone: +45 2243 7157

Email: [troels.hansen@knowit.dk](mailto:troels.hansen@knowit.dk)

**knowit**

**knowit**

# SAS Viya onboarding in Cloud with Knowit

JAN ZILSTORFF



# A sustainable & humane society



# 4,300

professionals

Established in 1990

Nordic Environmental, Social & Governance (ESG)

6 countries

Denmark / Sweden / Norway / Finland / Germany / Poland

4.727 mdkk

Net sales

331 mdkk

Adjusted operating profit (EBITA)

Supporting clients'  
digital transformation

knowit



Supporting clients'  
digital transformation

knowit

300+

professionals

Knowit Denmark

Nordic Environmental, Social & Governance (ESG)

3 locations

København / Aarhus / Aalborg

625 mdkk

Net sales

40 mdkk

Adjusted operating profit (EBITA)



Knowit erfaring  
med digitalisering i det offentlige

knowit



Styrelsen for Arbejdsmarked  
og Rekruttering



STYRELSEN FOR  
IT OG LÆRING



**UDVIKLINGS OG  
FORENKLINGS  
STYRELSEN**



ØKONOMISTYRELSEN



A-kassen for  
humanister og scient.er

tænk større

We create customer value across industries,  
markets and business segments

**SDC**



bankdata

**fotex**

 **Danish Crown**

 **STARK**  
Sammen bygger vi professionelt

**HK**  
SAMMEN  
ER DU  
STÆRKERE



 **Telia**

 **DSB**

nets

 **STYRELSEN FOR  
IT OG LÆRING**

**EGMONT**

**Vestas**

**AP**  
Pension

 **REJSEKORT**

 **UDVIKLINGS OG  
FORENKLINGS  
STYRELSEN**



 Styrelsen for Arbejdsmarked  
og Rekruttering

RIGSPOLITIET  
**POLITI**

**COBHAM**

 **milestone**

**Bilka**

**e-on**

**BEC**

 **ROCKWOOL**

**Topdanmark**  
Forsikring-Pension 

ARBEJDSMARKED  
REKRUTTERING  


**Danfoss**

talkmore

**TDC**

 **KØBENHAVNS KOMMUNE**

**LEGO**

**Ørsted**

**GRUNDFOS** 

# Kundecase



# Kundecase

- Mindre dansk virksomhed den finansielle sektor
- Afdækning af behov - simplificeret:
  - Adgang til SAS Viya til ~5 data analytikere
  - Hurtig etablering
  - Minimal indsats
  - SAAS løsning
  - Infrastruktur: execution & data skal være i skyen
- Dialog med SAS – herefter samarbejde med involvering af vores cloud infrastruktur team



# Kundecase

- Dialog med SAS med vores cloud team
- Fælles dialog med kunde
- Samarbejde med kunde og cloud team
- Etablering af miljø
- Overgang til drift



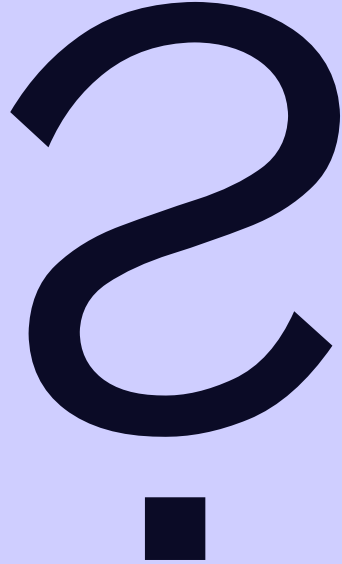
# Erfaringer

# Spørgsmål

- Generelt hurtig igangsætning
- Nogle udfordringer omkring integrationen: håndtering af bruger login med LDAP / integration med Azure AD
- Integration af on-premise database fra SAS Viya til kundens data kilde
- Etablering af start/stop processer til at begrænse omkostninger uden for normal arbejdstid (weekender og aften)
- Håndtering af certifikater
- Småting omkring en enkelt opdatering/version der gav udfordringer (kan ikke huske om det var en "stable" eller "long term")



Spørgsmål



# SAS Offering

Tried True and Battle Tested professionals with experience of working with SAS Products on both small scale and large scale within many different industries and sectors.

Knowit offers analytical professionals all over the Nordics as well as specialists focusing on IT platforms, Cloud Services and Change Projects - all the way from specific consultancy assignments in digital transformation to a total responsibility for our customers' IT in the Cloud.

Knowit provides [24/7 Operations](#) and [Support](#) with dedicated specialists that has received training on the SAS platform, ready to assist at any time, no matter if the customers environment is currently running on-prem, is hybrid or has been migrated to the cloud.



Knowit is a long-standing SAS International Gold Partner and has partnered with the three leading cloud infrastructure providers Microsoft, Amazon Web Services and Google Cloud, through the partnerships we can help our clients get the most out of the cloud at an early stage, through either help with POC funding or help with other incentives available through the different partner programs as well as outstanding partner support.

# SAS

## WHY SHOULD YOU MOVE TO THE CLOUD?



### Pay as you Go-model

- No up front investments needed
- Only pay for what is used.



### Scalable & Flexible

- Scale up if more capacity is needed
- Scale down if environment is unused



### Highly automatized

- Deploy new environments in hours not days with Infrastructure as Code
- Controlled testing and deployment



### Data Durability / Recovery

- Multi-AZ deployments
- Multi Region deployments
- Highly Durable and Reliant storage



### Regulatory Compliance

- Become PCI-DSS, GDPR, FIPS 140-2, ISO 27001 compliant.
- Industry Standard Encryption.



### Environmental Impact

- Become sustainable faster, with Data Centers running on 100% renewable energy\*
- With up to 3.6 times more efficient than On-Prem datacenters

\* Depending on the Cloud Platform

# SAS

## THE JOURNEY STARTS HERE!



### Managed Service

- 24/7 Operations & Support
- Your SAS Environment Simplified

*Managed and Supported by Knowit!*



### (Upgrade/Expand)

Make your SAS environment great!

- New features.
- New ...

### Cloud Migration

- Lift & Shift
- Lift & Transform
- App Modernisation



### Pre Migration Assessment

- Business...
- Legal...
- Operational...
- ...requirements



### Cloud Awareness / Cloud Strategy

- Cloud Platform
- Single / Multi Cloud
- Hybrid/Scale Out/Native



### Don't forget about training!

Knowit provides tailored training for your staff, with dedicated in-house trainers skilled on Cloud, DevOps etc.

# SAS

## OUR CLOUD OFFERING IN KNOWIT



### Automagic

- Up and running in very short timespan
- Infrastructure as code
- Uses Terraform



### 24/7 Support

- Start troubleshooting within agreed SLA (eks. 15 minutes)



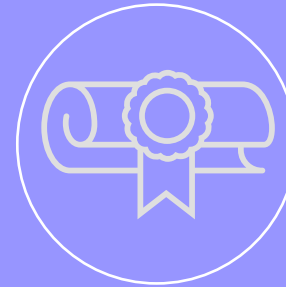
### Secure

- HSM, WAF, Volume Encryption
- ISO certified



### No Lock-in

- Pay as you go
- Open-source platform



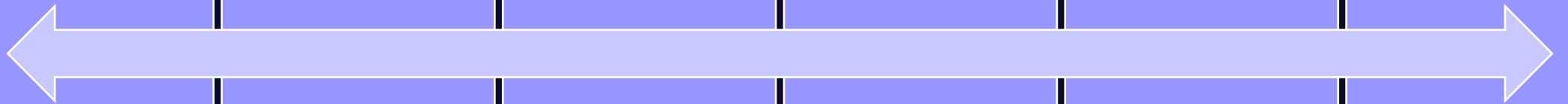
### Certified

- ISO 27001, 27017 and 27018
- GDPR safe






### Sustainable

- Powered by 100% green energy.



# SAS

## T-Shirt sized SAS VIYA 4 - Cloud Environments

		
SMALL	MEDIUM	LARGE
Monthly Running Rate (excl. license) Xxxx DKR	Monthly Running Rate (excl. license) Xxxx DKR	Monthly Running Rate (excl. license) Xxxx DKR

# SAS

## OPERATIONS – INCLUDED IN THE OFFERING



### MONITORING

Systematic ongoing collection, collation, and analysis of data and the timely dissemination of information to those who need to know so that action can be taken

- 24 / 7 Platform Level Monitoring



### RELEASE & DEPLOYMENT

Release and Deployment Management aims to plan, schedule and control the movement of releases to test and live environments

- Maintenance and management of automatic deployment components.



### BACKUP

Backup is the activity of copying data to preserve it in case of equipment failure or catastrophes.

- Automated Cloud Backup (for Disaster Recovery).



### BUDGET

- Rightsizing recommendations and idle resource identification.
- Forecasting and usage tracking.



### DOCUMENTATION

- Keeping the service documentation up to date.



### MONTHLY STATUS

- Management level reports.



# SAS 24/7 Support

OPTIONAL SERVICE

knowit 1<sup>st</sup> Line Support

Swedish/English  
24/7 Platform Support

Sweden, Argentina



knowit 2<sup>nd</sup> Line Support

Swedish/English  
24/7 Platform Support

Sweden, Argentina



Application 3<sup>rd</sup> Line Support

Workdays 8-17

Sweden, Denmark, Norway & Finland



# Why Argentina?

EU + AR =



## GDPR!

The European Commission has the power to determine, on the basis of article 45 of [Regulation \(EU\) 2016/679](#) whether a country outside the EU offers an [adequate level](#) of data protection.

The European Commission has so far recognised Andorra, [Argentina](#), Canada (commercial organisations), Faroe Islands, Guernsey, Israel, Isle of man, Japan, Jersey, New Zealand, Switzerland and Uruguay as providing adequate protection.

# Shared Responsibility Model

RESPONSIBLE

**Customer**

**Applications Inside of SAS Viya, SAS License, Customer Data, etc.**

**Knowit**

**Operations, Support, Upgrades of SAS Viya (running on Kubernetes), Application Accesses**

**Knowit**

**Billing, Monitoring, Reporting, Lifecycle Management**

**Cloud Vendor**

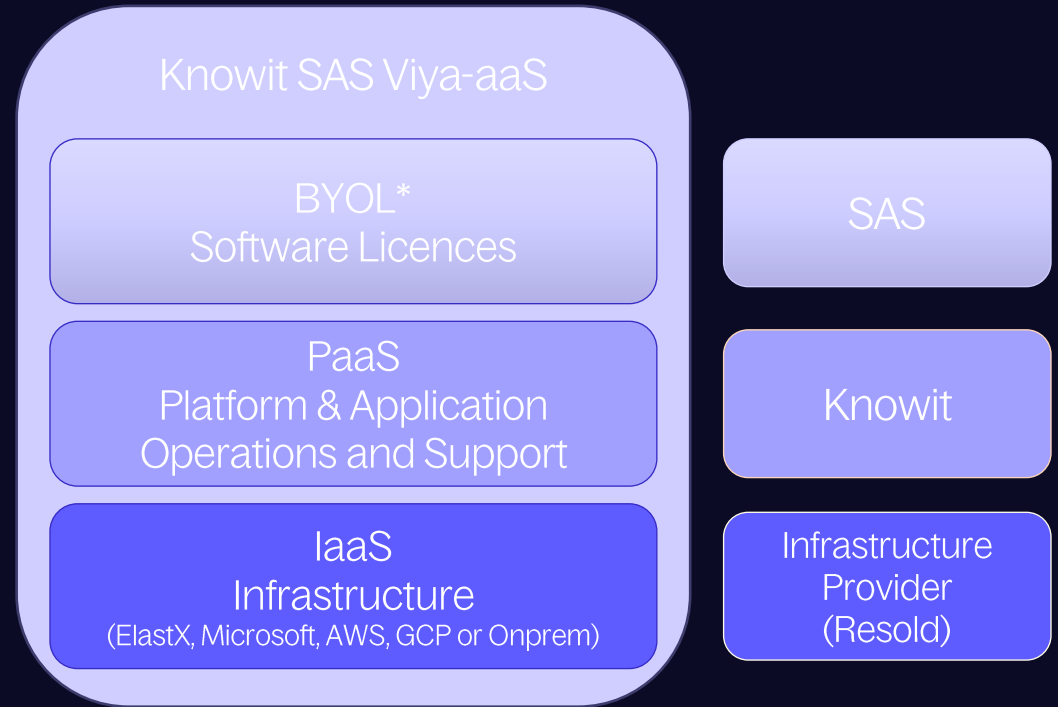
**Physical Facilities, Data Centers, Network, Servers, Harddrives etc.**

# Breakdown Our Service vs. SAS Cloud

Packaged Solution from SAS, incl. SAS Licence, Cloud Infrastructure, Operations and Support.



Packaged Solution on “any cloud” (K8S\*), in the cloud or on-prem. SAS License not included (BYOL).



\* K8S: Kubernetes  
 \* BYOL: Bring your own licens

# SAS Viya CLOUD

## YOUR SAS PLATFORM SIMPLIFIED

Dedicated Knowit Delivery Manager - Single Point of Contact

### Service Desk

- Portal, Phone, E-mail Support
- Automation

### Operations and Support

- Monitoring & Alerts
- Capacity Planning
- Budget Forecasting

New functionality ...

**Option:** Licensing, Cloud Spend and Consultancy on one single Knowit invoice



**Jan Zilstorff**

Head of Information Management



**Knowit**

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Phone: +45 5365 5616

Email: [Jan.Zilstorff@Knowit.dk](mailto:Jan.Zilstorff@Knowit.dk)

**knowit**