OpenRiskNet e-infrastructure Deployment

The OpenRiskNet Consortium

OpenRiskNet: Open e-Infrastructure to Support Data Sharing, Knowledge Integration and *in silico* Analysis and Modelling in Risk Assessment
Project Number 731075
OpenRiskNet Virtual Environment (VE)

- Computational infrastructure into which applications can be deployed
- Includes environment for building and testing those applications
- Includes compute, security, storage, monitoring ...
- Can be deployed to range of infrastructures
VE Architecture

Partner applications
Jaqpot, Lazar, BridgeDB, Squonk, Modelling web ...

3rd party applications
Jupyter notebooks, CDK Depict ...

ORN VE

Application infrastructure
Databases, message queues

Monitoring
Metrics, logging

Security
SSO, certificates

CI/CD
Container registry, builds, pipelines

Hardware
Physical hardware, in-house or cloud VMs

Your applications
Example OpenRiskNet VEs

ORN Reference site ([link](#))

ORN Development site

Sites run by ORN partners

Diamond Light Source ([link](#))
What forms a VE

OpenShift
Red Hat’s distribution of Kubernetes

Kubernetes
Container orchestration platform backed by Google

Containers
A way to package software and deploy it in an isolated and controlled manner made popular by Docker

Containers Poll

Support
Security
CI/CD

https://www.openshift.com/
https://kubernetes.io/
https://www.docker.com/
History of Orchestration Tools

- **KubeNow** from UU allows to deploy K8S or Openshift.
- OKD Orchestrator described here builds on principles from KubeNow to provide an orchestrator specific for OpenShift and targeted towards deploying an OpenRiskNet VE.
- Orchestration tools coming with OpenShift 4 look much improved and may supersede these other tools.
Steps to deployment:

1. Plan the hardware needs (Servers, CPUs, memory, availability ...)
2. Set up public IP addresses and hostnames
3. Run Orchestrator
   a. Stage 1: Define configuration based on #1 and #2
   b. Stage 2: Compile machine images (not needed if using bare metal)
   c. Stage 3: Provision VMs (not needed if using bare metal)
   d. Stage 4: Deploy OpenShift
4. Run “day 2” operations
5. Deploy applications
<table>
<thead>
<tr>
<th>Setup</th>
<th>Bare metal</th>
<th>OpenStack</th>
<th>AWS</th>
<th>GCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+</td>
</tr>
<tr>
<td>Standard</td>
<td>+++</td>
<td>+</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>High Availability</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

+++ Tested
+ Should work but not much tested
- Planned

Other potential platforms:
- Azure
- Digital Ocean
- Others?
Acknowledgements

OpenRiskNet (Grant Agreement 731075) is a project funded by the European Commission within Horizon2020 Programme

Project partners:

P1 Douglas Connect GmbH, Switzerland (DC)
P2 Johannes Gutenberg-Universitat Mainz, Germany (JGU)
P3 Fundacio Centre De Regulacio Genomica, Spain (CRG)
P4 Universiteit Maastricht, Netherlands (UM)
P5 The University Of Birmingham, United Kingdom (UoB)
P6 National Technical University Of Athens, Greece (NTUA)
P7 Fraunhofer Gesellschaft Zur Foerderung Der Angewandten Forschung E.V., Germany (Fraunhofer)
P8 Uppsala Universitet, Sweden (UU)
P9 Medizinische Universitat Innsbruck, Austria (MUI)
P10 Informatics Matters Limited, United Kingdom (IM)
P11 Institut National De L’environnement Et Des Risques INERIS, France (INERIS)
P12 Vrije Universiteit Amsterdam, Netherlands (VU)
Links

These slides and videos: https://openrisknet.org/events/57/

OKD Orchestrator Github: https://github.com/InformaticsMatters/okd-orchestrator

OKD Orchestrator Docs: https://docs.informaticsmaters.com/build/html/index.html

Red Hat OpenShift (OKD): https://www.okd.io/

OKD Documentation: https://docs.okd.io/latest/welcome/index.html


OpenRiskNet website: https://openrisknet.org/

OpenRiskNet reference site: https://home.prod.openrisknet.org/