IKO

InterSystems Kubernetes Operator

InterSystems
Creative data technology

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kubernetes

Orchestrateur
de container

Options de déploiements

- Déployer dans le cloud à l'aide d'ICM
  - InterSystems Cloud Manager (ICM) fournit un moyen simple et intuitif de provisionner une infrastructure cloud publique ou privée et de déployer des services dessus, apportant tous les avantages de l'automatisation et de l'infrastructure en tant que code (IaC) au déploiement conteneurisé ou sans conteneur des produits InterSystems.
  - ICM peut également être déployé sur une infrastructure existante.
- Déployer sur Kubernetes à l'aide de l'opérateur InterSystems Kubernetes
  - L'opérateur InterSystems Kubernetes (IKO) étend l'API Kubernetes avec la ressource personnalisée IrisCluster, qui peut être déployée en tant que cluster partitionné InterSystems IRIS, cluster de cache distribué ou instance autonome (tous éventuellement mis en miroir) sur n'importe quelle plate-forme Kubernetes.
  - IKO vous permet de tirer parti de Kubernetes pour le déploiement, la mise à l'échelle et la gestion automatisés de votre application conteneurisée basée sur un cluster partitionné.
- Déployer dans des conteneurs
  - Le déploiement dans des conteneurs est agile, hautement reproductible et bien adapté aux plateformes de cloud public, ainsi qu'au déploiement sur site.
  - Les conteneurs séparent proprement le code des données et prennent en charge CI/CD et une approche DevOps, afin que vous puissiez accélérer les améliorations sur le terrain.

Options de déploiements (suite)

- Déployer à l'aide d'un kit d'installation
  - Utilisez un kit d'installation traditionnel pour installer des instances de produit sur un large éventail de plates-formes dans n'importe quel environnement cloud ou sur site.
- Automatiser le déploiement à l'aide de la fusion de configuration (MERGE)
  - La fonction de fusion de configuration prend en charge le déploiement automatisé en vous permettant de varier les configurations de plusieurs instances InterSystems IRIS déployées à partir de la même image de conteneur ou du même kit d'installation.
- Déployer une instance Community Edition gratuite
  - Instance web gratuite
  - Vous pouvez déployer un conteneur InterSystems IRIS® Community Edition gratuit sur une plateforme cloud publique (Amazon Web Services, Google Cloud Platform, Microsoft Azure) ou sur votre propre système.

Pourquoi utiliser Kubernetes ?

Kubernetes est un **moteur d'orchestration** open source pour **automatiser le déploiement**, la **mise à l'échelle** et la **gestion des charges de travail et des services conteneurisés**, et excelle dans l'orchestration d'applications SaaS (logiciel en tant que service) complexes.
Vous provisionnez un cluster compatible Kubernetes et indiquez à Kubernetes les services conteneurisés que vous souhaitez déployer dessus et les politiques par lesquelles vous souhaitez qu'ils soient régis ; Kubernetes **fournit** de manière transparente **les ressources nécessaires** de la manière la plus efficace possible, **répare** ou **restaure** la configuration lorsque des problèmes avec ces ressources la font s'écarter de ce que vous avez spécifié, et **peut évoluer automatiquement** ou **à la demande**.
En termes simples, Kubernetes **déploie** une application multi-conteneurs dans la configuration et à l'échelle que vous spécifiez **sur n'importe quelle plate-forme** compatible Kubernetes, et **maintient** l'application fonctionnant exactement comme vous l'avez décrite.

kubernetes

Why do I need the InterSystems Kubernetes Operator?

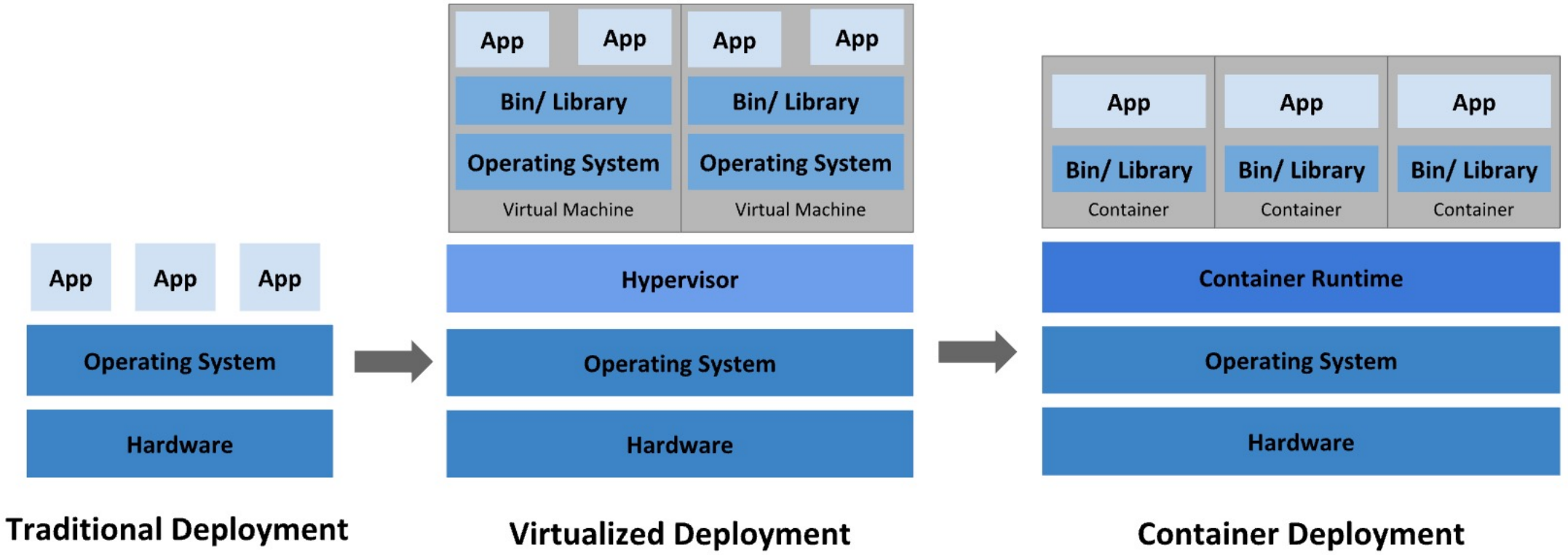
In Kubernetes, a resource is an endpoint that stores a collection of API objects of a certain kind, from which an instance of the resource can be created or deployed as an object on the cluster. For example, built-in resources include, among many others, *pod* (a set of running containers), *service* (a network service representing an application running on a set of pods), and *persistentvolume* (a directory containing persistent data, accessible to the containers in a pod).

The **InterSystems Kubernetes Operator** (IKO) extends the resources built into the Kubernetes API with a custom resource called ***IrisCluster***, representing an **InterSystems IRIS cluster**. An instance of this resource — that is, a sharded cluster, or a standalone InterSystems IRIS instance, optionally configured with application servers in a distributed cache cluster — can be deployed on any Kubernetes platform on which the IKO is installed and benefit from all the features of Kubernetes such as its services, role-based access control (RBAC), and so on.

The **IrisCluster** resource isn't required to deploy InterSystems IRIS under Kubernetes. But because Kubernetes is application-independent, you would need to create custom definitions and scripts to handle all the needed configuration of the InterSystems IRIS instances or other components in the deployed containers, along with networking, persistent storage requirements, and so on.

Installing the **IKO** **automates** these tasks. By putting together a few settings that define the cluster, for example the number of data and compute nodes, whether they should be mirrored, and where the Docker credentials needed to pull the container images are stored, you can **easily deploy** your InterSystems IRIS cluster exactly as you want it. The operator also adds **InterSystems IRIS-specific cluster management capabilities** to Kubernetes, enabling tasks like adding data or compute nodes, which you would otherwise have to do manually by interacting directly with the instances.

Petit retour en arrière



Le rôle de Kubernetes

Service discovery and load balancing

Kubernetes can expose a container using the DNS name or using their own IP address. If traffic to a container is high, Kubernetes is able to load balance and distribute the network traffic so that the deployment is stable.

Storage orchestration

Kubernetes allows you to automatically mount a storage system of your choice, such as local storages, public cloud providers, and more.

Automated rollouts and rollbacks

You can describe the desired state for your deployed containers using Kubernetes, and it can change the actual state to the desired state at a controlled rate. For example, you can automate Kubernetes to create new containers for your deployment, remove existing containers and adopt all their resources to the new container.

Automatic bin packing

You provide Kubernetes with a cluster of nodes that it can use to run containerized tasks. You tell Kubernetes how much CPU and memory (RAM) each container needs. Kubernetes can fit containers onto your nodes to make the best use of your resources.

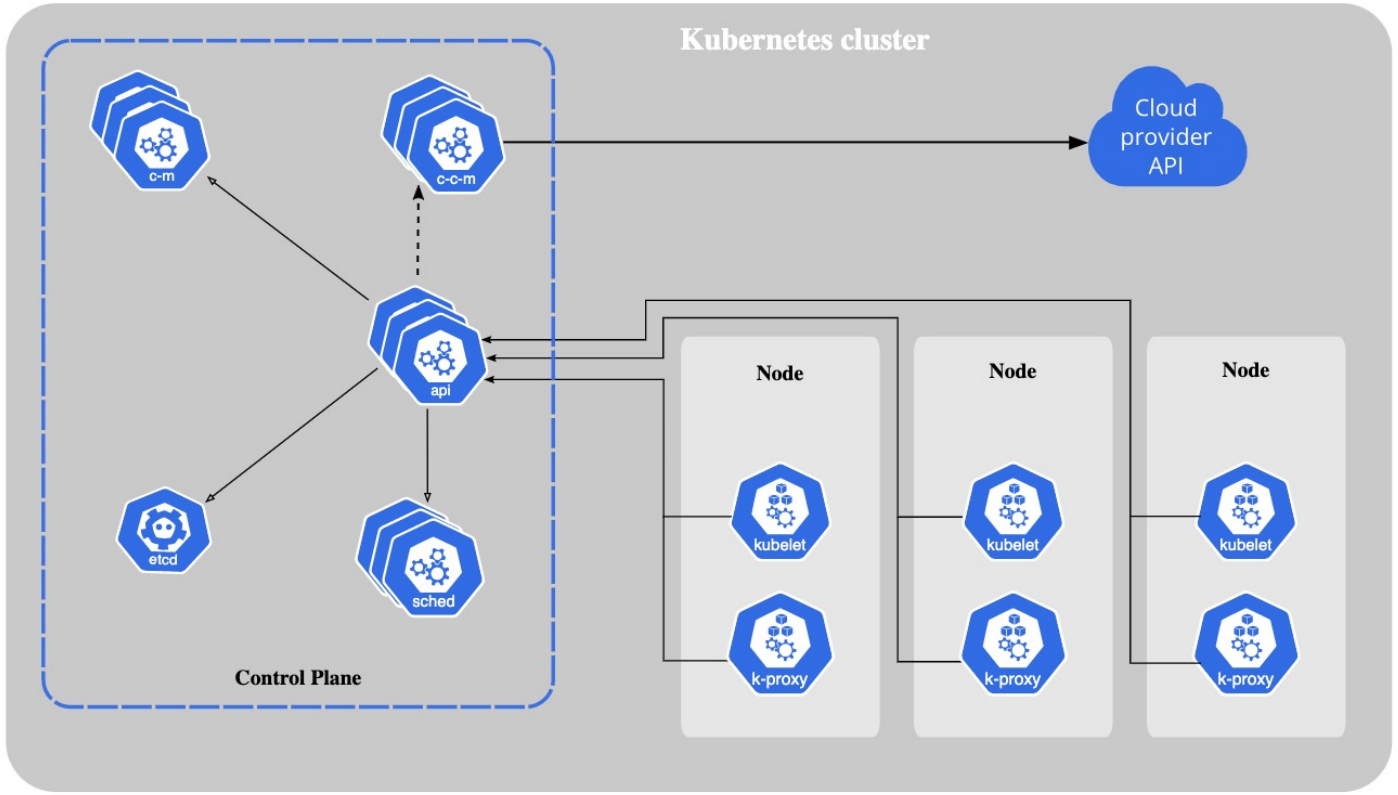
Self-healing

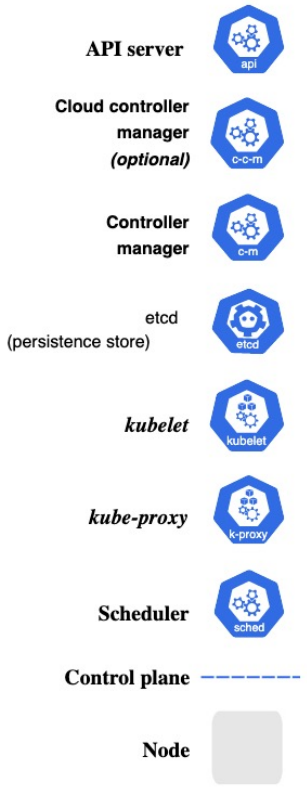
Kubernetes restarts containers that fail, replaces containers, kills containers that don't respond to your user-defined health check, and doesn't advertise them to clients until they are ready to serve.

Secret and configuration management

Kubernetes lets you store and manage sensitive information, such as passwords, OAuth tokens, and SSH keys. You can deploy and update secrets and application configuration without rebuilding your container images, and without exposing secrets in your stack configuration.

Composants Kubernetes





Control Plane Components

- kube-apiserver
- etcd
- kube-scheduler
- kube-controller-manager
- cloud-controller-manager

Node Components

- kubelet
- kube-proxy

https://kubernetes.io/docs/concepts/overview/components/

Extensions Kubernetes

Operator

- https://kubernetes.io/docs/concepts/extend-kubernetes/operator/

Motivation

- The Operator pattern aims to capture the key aim of a human operator who is managing a service or set of services. Human operators who look after specific applications and services have deep knowledge of how the system ought to behave, how to deploy it, and how to react if there are problems.
- People who run workloads on Kubernetes often like to use automation to take care of repeatable tasks. The Operator pattern captures how you can write code to automate a task beyond what Kubernetes itself provides.

Operators in Kubernetes

- Kubernetes is designed for automation. Out of the box, you get lots of built-in automation from the core of Kubernetes. You can use Kubernetes to automate deploying and running workloads, *and* you can automate how Kubernetes does that.
- Kubernetes' controllers concept lets you extend the cluster's behaviour without modifying the code of Kubernetes itself. Operators are clients of the Kubernetes API that act as controllers for a Custom Resource.

Fichiers de distribution de IKO

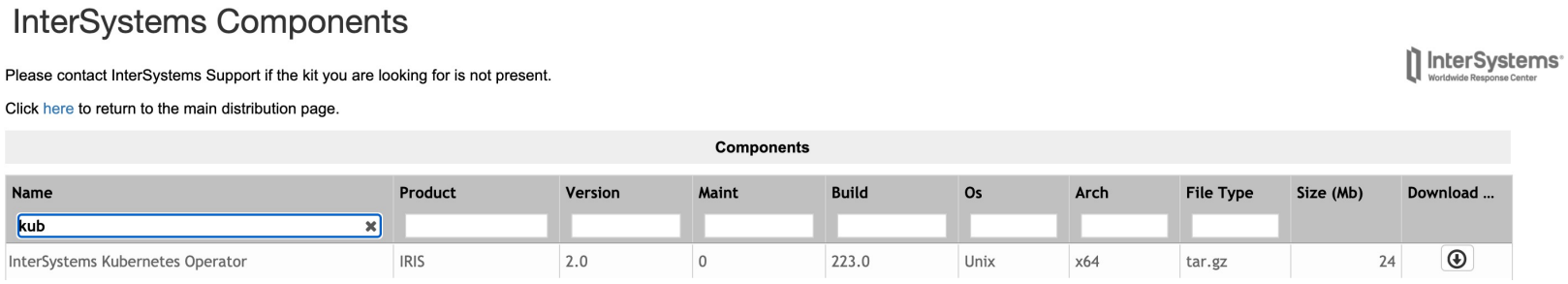
Vous pouvez obtenir IKO depuis 2 sources :

- **le référentiel containers.intersystems.com**

```
$ docker pull containers.intersystems.com/intersystems/iris-operator:2.0.0.223.0
```

- **le site Web de distribution du WRC dans la section Composants.**

https://wrc.intersystems.com/wrc/coDistGen.csp




```
iris_operator-2.0.0.223.0
├── 111README
├── chart
│   └── iris-operator
│       ├── Chart.yaml
│       ├── README.md
│       ├── templates
│       │   ├── NOTES.txt
│       │   ├── _helpers.tpl
│       │   ├── apiregistration.yaml
│       │   ├── appcatalog-user-roles.yaml
│       │   ├── cleaner.yaml
│       │   ├── cluster-role-binding.yaml
│       │   ├── cluster-role.yaml
│       │   ├── deployment.yaml
│       │   ├── mutating-webhook.yaml
│       │   ├── service-account.yaml
│       │   ├── service.yaml
│       │   ├── user-roles.yaml
│       │   └── validating-webhook.yaml
│       └── values.yaml
├── image
│   └── iris_operator-2.0.0.223.0-docker.tgz
└── samples
    ├── compute.cpf
    ├── data.cpf
    ├── iris-gs2019-aks.yaml
    ├── iris-gs2019-eks.yaml
    ├── iris-gs2019-tke.yaml
    ├── iris-gs2019.yaml
    ├── iris-ssd-sc-aks.yaml
    ├── iris-ssd-sc-eks.yaml
    ├── iris-ssd-sc-gke.yaml
    ├── iris-ssd-sc-tke.yaml
    └── stash
        ├── gcs-repo.yaml
        ├── iris-gs2019-backupbatch.yaml
        ├── iris-gs2019-backupconfig.yaml
        └── iris-gs2019-backupsession.yaml

6 directories, 32 files
```

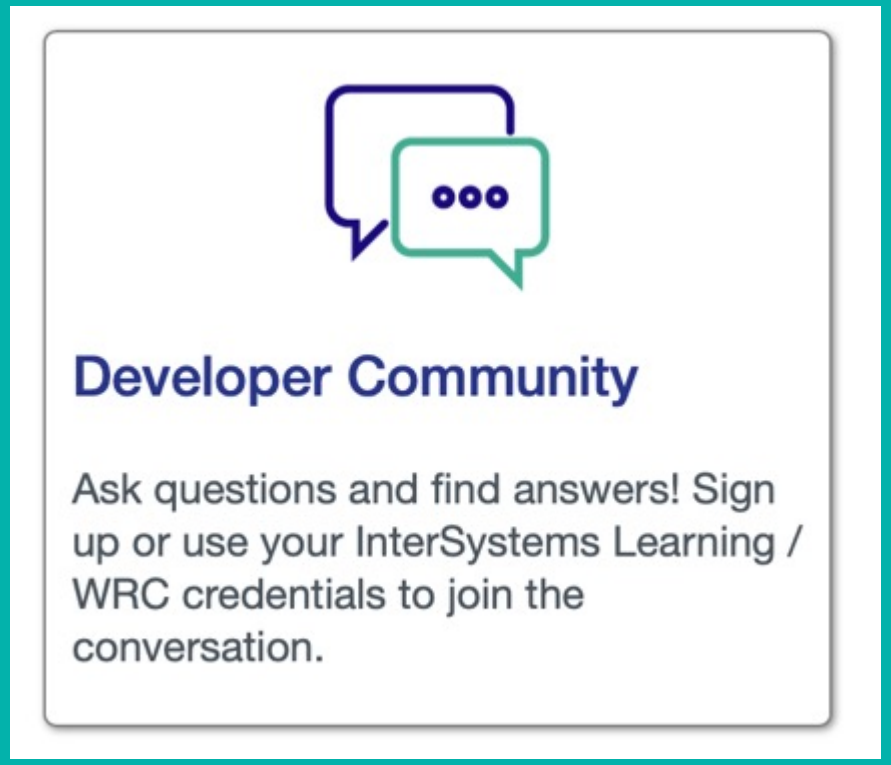
Tutorials

Using InterSystems Kubernetes Operator

https://docs.intersystems.com/irislatest/csp/docbook/Doc.View.cls?KEY=AIKO

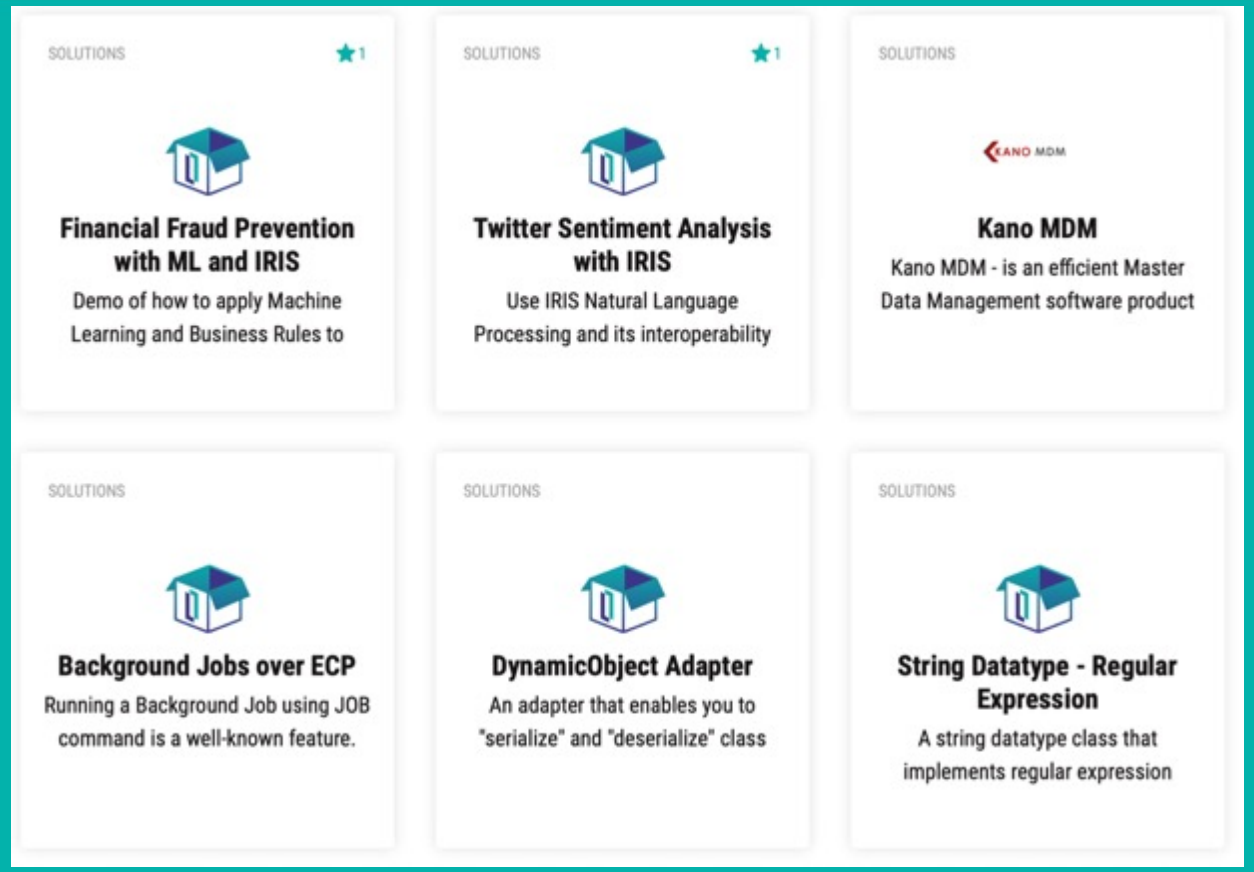
Community : InterSystems Kubernetes Operator Deep Dive: Part 2

- https://community.intersystems.com/post/intersystems-kubernetes-operator-deep-dive-part-2



https://community.intersystems.com/

InterSystems
Developer Community



https://openexchange.intersystems.com/

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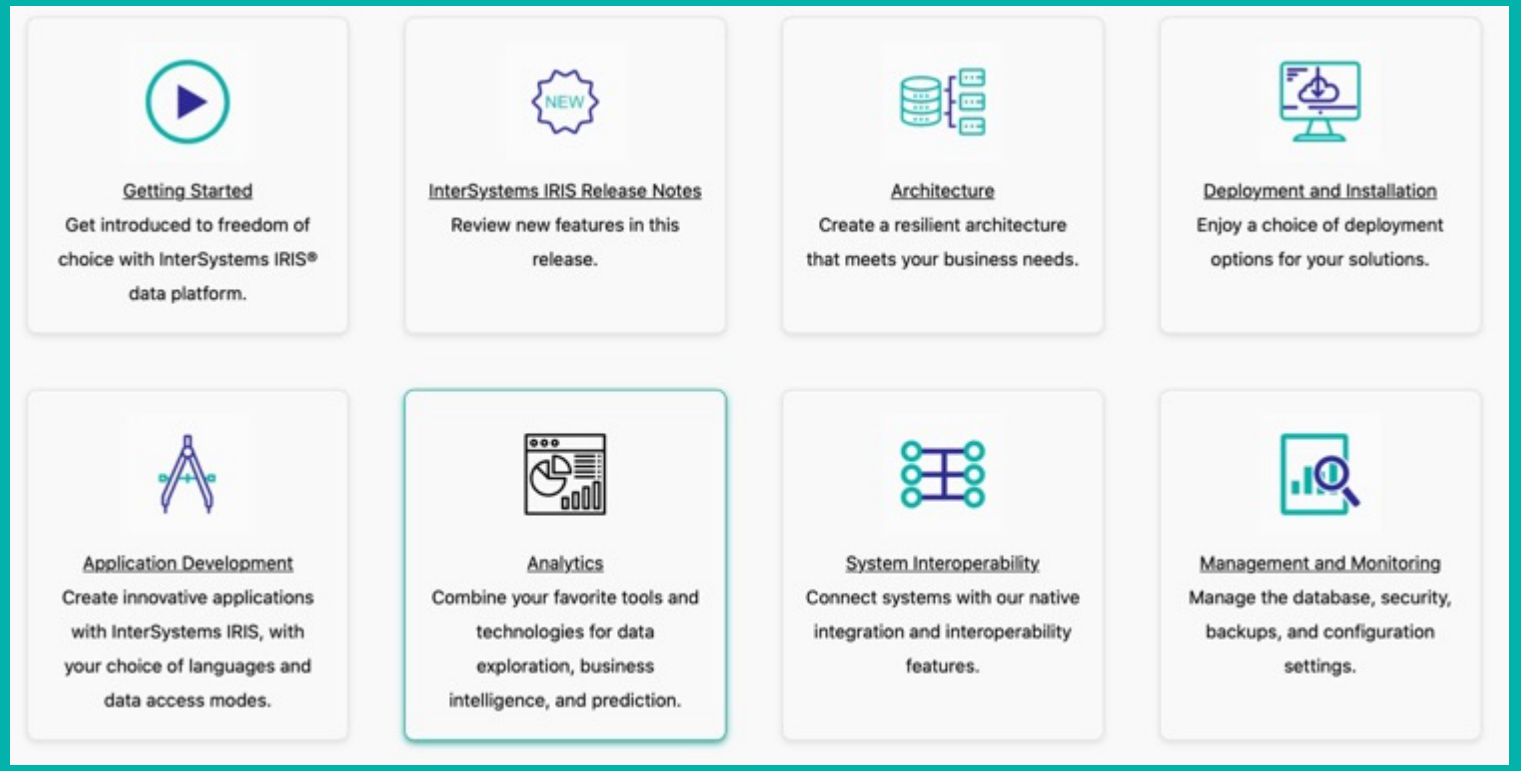
Open Exchange



https://docs.intersystems.com/

Documentation

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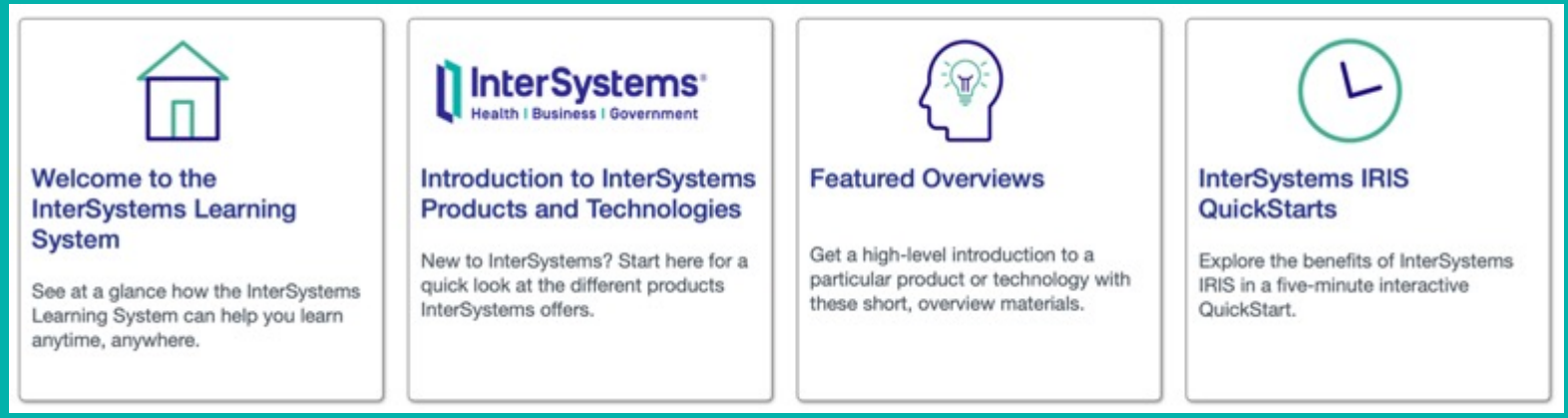

https://learning.intersystems.com

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Merci