

Blaise



Blaise Deployment Fallback / Cloud

October 23th, 2023



Topics Presentation (1)

- Blaise Server roles
 - Changes applied to Blaise Server roles 5.13 → 5.14
 - Fallback Server roles
- Blaise in the Cloud
 - Technical Architecture
 - Docker
 - Kubernetes
 - Kafka
 - Monitoring : Prometheus & Grafana
 - Blaise cloud applications / containers



Topics Presentation (2)

- Blaise in the Cloud
 - Deployment
 - Deployment of Blaise in the cloud
 - Deployment of a (web)survey
 - Monitoring and checking running state
 - Scaling : horizontally and vertically
 - Upgrading / downgrading Blaise versions
 - Installing multiple versions of Blaise side-by-side
 - Security
 - Troubleshooting



Blaise Server Roles 5.13

Version 5.13	Server role description
Cati	The <i>CATI</i> server is responsible for making day batches, appropriately handling CATI requests and keeping track of their status. A server park can hold only <u>one</u> <i>CATI</i> server.
Data	A <i>Data</i> server stores the survey data collected with Blaise instruments. A server park can hold only <u>one</u> <i>Data</i> server
Data Entry	A <i>Data Entry</i> server handles pages and executes the rules for Blaise surveys. A Server Park can hold <u>multiple</u> publicly hosted <i>Data Entry</i> servers.
Event	The <i>Event</i> server stores all events while working with the Blaise system. A server park can hold only <u>one</u> <i>Event</i> server.
Resource	A <i>Resource</i> server hosts the intangible resources like corporate templates, images, brands, embedded fonts etc. for Blaise surveys. A server park can hold <u>multiple</u> <i>Resource</i> servers.
Session	A <i>Session</i> server manages and stores all data of active interview sessions. A server park can hold only <u>one</u> <i>Session</i> server.
Web	A <i>Web</i> server hosts files for Blaise internet surveys. A server park can hold <u>multiple</u> <i>Web</i> servers.
Audit Trail	An Audit Trail server is used to collect Audit Trail para data. The role is also used in this and previous versions for Publishing events and Cari functionality. A server park can hold only <u>one</u> <i>Audit Trail</i> server.



Blaise Server Roles - Changes

Version 5.14	Changes to Blaise server roles
Data	A <i>Data</i> server stores the survey data collected with Blaise instruments. A server park can hold <u>multiple</u> <i>Data</i> servers
Session	A <i>Session</i> server manages and stores all data of active interview sessions. A server park can hold <u>multiple</u> <i>Session</i> servers.
Audit Trail	An Audit Trail server is used to collect Audit Trail para data. The Event Publishing service and Cari service are not part of the Audit Role anymore, because for these two services a dedicated role has been introduced (see below). A server park can hold <u>multiple</u> <i>Audit Trail</i> servers.
Cari	A <i>CARI</i> server is used to collect CARI para data such as audio recordings and screenshots. A server park can hold only <u>one</u> <i>CARI</i> server
Publish	A <i>Publish</i> server hosts the Server Events Publish/Subscribe services. With these services you can subscribe to events and/or signal certain events. A server park can hold only <u>one</u> <i>Publish</i> server.
Case Management	A <i>Case Management</i> server is responsible for handling Case Management requests and processing of case events. A server park can hold only <u>one</u> <i>Case Management</i> server.



Fallback Server Roles

- Blaise Server Park
 - Single Server Roles: Data, Audit Trail, Session
 - Single Point of Failure
- Goal: Want to increase availability
- Solution: Allow to define fallback Server(s):
 - Multiple Servers can have 'single' server role when:
 - Data is stored in a database (not file-based) for each Survey
- Fallback mechanism:
 - When Request to (single role) Server fails, the Request is sent to a fallback Server.



Fallback for Data Server Role

- Record Locking implementation changes:
 - Record Locks are currently stored in Memory in Data Service
 - Not suited for Park with Fallback Data Server(s)
 - Solution: Store Record Locks in a (not file-based) Database.
 - Define Record Locking Data Interface.
- Sample deployment:

Server Park Servers													
Internal Name	Audit Trail	CARI	Cati	Data	Data Entry	Event	Publish	Case Management	Resource	Session	Web	Status	Blaise Version
perfserver4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Active	5.14.0.3617
perfserver3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3617
perfserver2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3617
perfserver1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	5.14.0.3617



Fallback for Audit Trail Server Role

- Audit Trail implementation changes
 - No changes required: Audit Trail service only writes to its database
 - Audit Trail Data must be stored in a (not file-based) Database

Server Park Servers													
Internal Name	Audit Trail	CARI	Cati	Data	Data Entry	Event	Publish	Case Management	Resource	Session	Web	Status	Blaise Version
perfserver1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Active	5.14.0.3615



Fallback for Session Server Role

- Session Data must be stored in a (not file-based) Database.
- Implementation of Session Service has hardly changed:
 - In Memory updates to a Buffer
 - Periodic update of Session Database
 - Main reason: Preserve Performance

Server Park Servers													
Internal Name	Audit Trail	CARI	Cati	Data	Data Entry	Event	Publish	Case Management	Resource	Session	Web	Status	Blaise Version
perfserver1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver3	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.3615
perfserver4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Active	5.14.0.3615



Fallback Server Roles - Database configuration

Configuration

- Logical Roots (1)
- Configuration Settings
- Server Roles

Configuration Settings

Connection | Dashboard | Advanced Timing Settings | Alternative Storage

Session Data Interface:	<input type="text" value="C:\blaise5\Settings\SessionDataSQLServer.bsdi"/>
Audit Trail Data Interface:	<input type="text" value="C:\blaise5\Settings\AuditTrailDataSQLServer.badi"/>
CATI Data Interface:	<input type="text"/>
CARI Data Interface:	<input type="text"/>
Configuration Data Interface:	<input type="text"/>
Credentials Data Interface:	<input type="text"/>
Event Management Data Interface:	<input type="text"/>
Locks Data Interface:	<input type="text" value="C:\blaise5\Settings\DataLockSQLServer.bldi"/>
Case Management Data Interface:	<input type="text"/>



Architecture (1) – Blaise Cloud Solution

Architecture of the Blaise Cloud technology stack

- Docker
 - Containerization
- Kubernetes
 - Container workload management
- Apache Kafka
 - Messaging between containers and other applications
- Prometheus & Grafana
 - Collecting, monitoring, analyzing and visualizing metrics



Architecture (2) - Docker

Docker – Containerization

- Run anywhere, decouple application logic from underlying system
- Footprint is very small & deployment only takes seconds
- Using containers fits well in scalable solutions
- Container images/apps are versioned and stored in a container registry (DockerHub)
- During deployment images are pulled from a container registry



Architecture (3) - Kubernetes

Kubernetes – Workload Management

- Kubernetes cluster consist of one or more nodes/worker machines where containers/apps are deployed in so called pods
- All Blaise apps (data entry, web,...) are deployed within pods
- Kubernetes continuously monitors the workload/metrics of the deployed application/services in the cluster
- Supports (auto-)scaling; both horizontal and vertical
- Supports file shares/persistent volumes and load-balancing
- Kafka brokers are also deployed in the cluster



Architecture (4) - Apache Kafka

Apache Kafka – Distributed Messaging

- Provides a unified, high-throughput, low-latency platform for handling real-time data feeds
- Apps sends messages on a topic to Kafka (producer/publish)
- Apps consume messages from a topic from Kafka (consumer/subscribe)
- Offers scalability out-of-the-box; create multiple consumers per topic
- Offers high availability out-of-the-box; deploy multiple brokers in a cluster. If one fails, the others will take over



Architecture (5) - Prometheus/Grafana

Prometheus & Grafana - Monitoring

- Prometheus
 - Metrics data collection
 - From Kubernetes/Kafka (CPU, Memory, IO and Network traffic)
 - From Blaise Cloud Apps (Messages, Requests/Responses and Duration)
- Grafana
 - Metrics data visualization



Deployment – Blaise (1)

- Blaise Apps / Containers
 - The following Blaise Services / Apps can be deployed in the cloud:
 - Data Entry, Audit Trail, Session, Resource, Data, Web and Cari
 - For now: no Manipula, no Data Entry Apps, no CMA/CMA Admin
 - It is possible to run CATI (web) surveys in the cloud, but then the CATI, Data, Session, Audit Trail roles have to be on-premise. Also the Dashboard runs on-premise.



Deployment – Blaise (2)

- First create an on-premise server and do not select server roles that you want to run in the cloud, e.g.

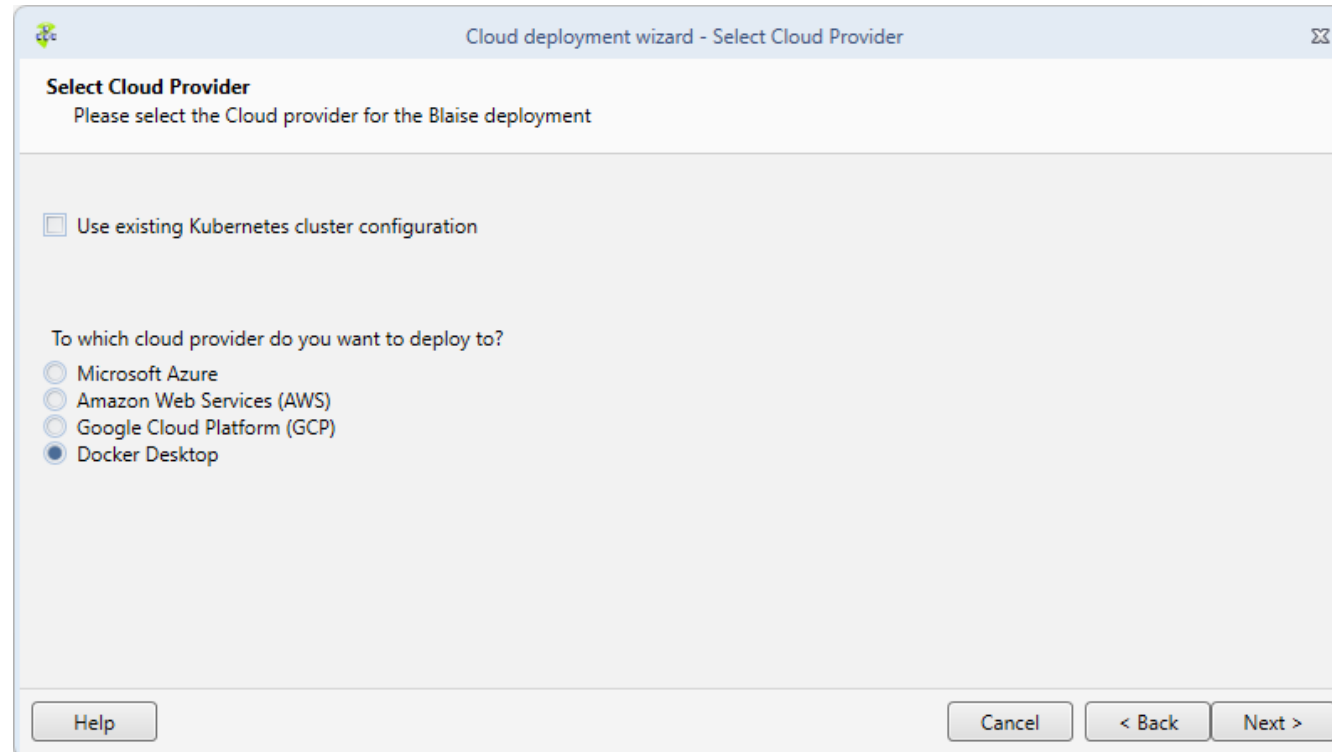
Server Park Servers													
Internal Name	Audit Trail	CARI	Cati	Data	Data Entry	Event	Publish	Case Management	Resource	Session	Web	Status	Blaise Version
DESKTOP-0J1J8LU	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.0

- Remark: Select also the web role otherwise a deployed web survey in the cloud fails to start



Deployment – Blaise (3)

- Click the  button to start the Cloud deployment Wizard



The screenshot shows a dialog box titled "Cloud deployment wizard - Select Cloud Provider". The main heading is "Select Cloud Provider" with the instruction "Please select the Cloud provider for the Blaise deployment". There is a checkbox labeled "Use existing Kubernetes cluster configuration" which is currently unchecked. Below this, a question asks "To which cloud provider do you want to deploy to?". There are four radio button options: "Microsoft Azure", "Amazon Web Services (AWS)", "Google Cloud Platform (GCP)", and "Docker Desktop". The "Docker Desktop" option is selected. At the bottom of the dialog, there are four buttons: "Help", "Cancel", "< Back", and "Next >".



Deployment – Blaise (4)

- Select the Blaise Version for the container

Cloud deployment wizard - Blaise details

Blaise details
Please provide the details for the Blaise deployment.

Machine Key: Specify the machine key that is used by the Servers of this Park

Roles to Host in Cloud

- DataEntry
- Resource
- Web
- Data
- Session
- AuditTrail
- Cari

Blaise Version:

Time Zone: Specify the timezone for the container apps of this park

Deploy Metrics

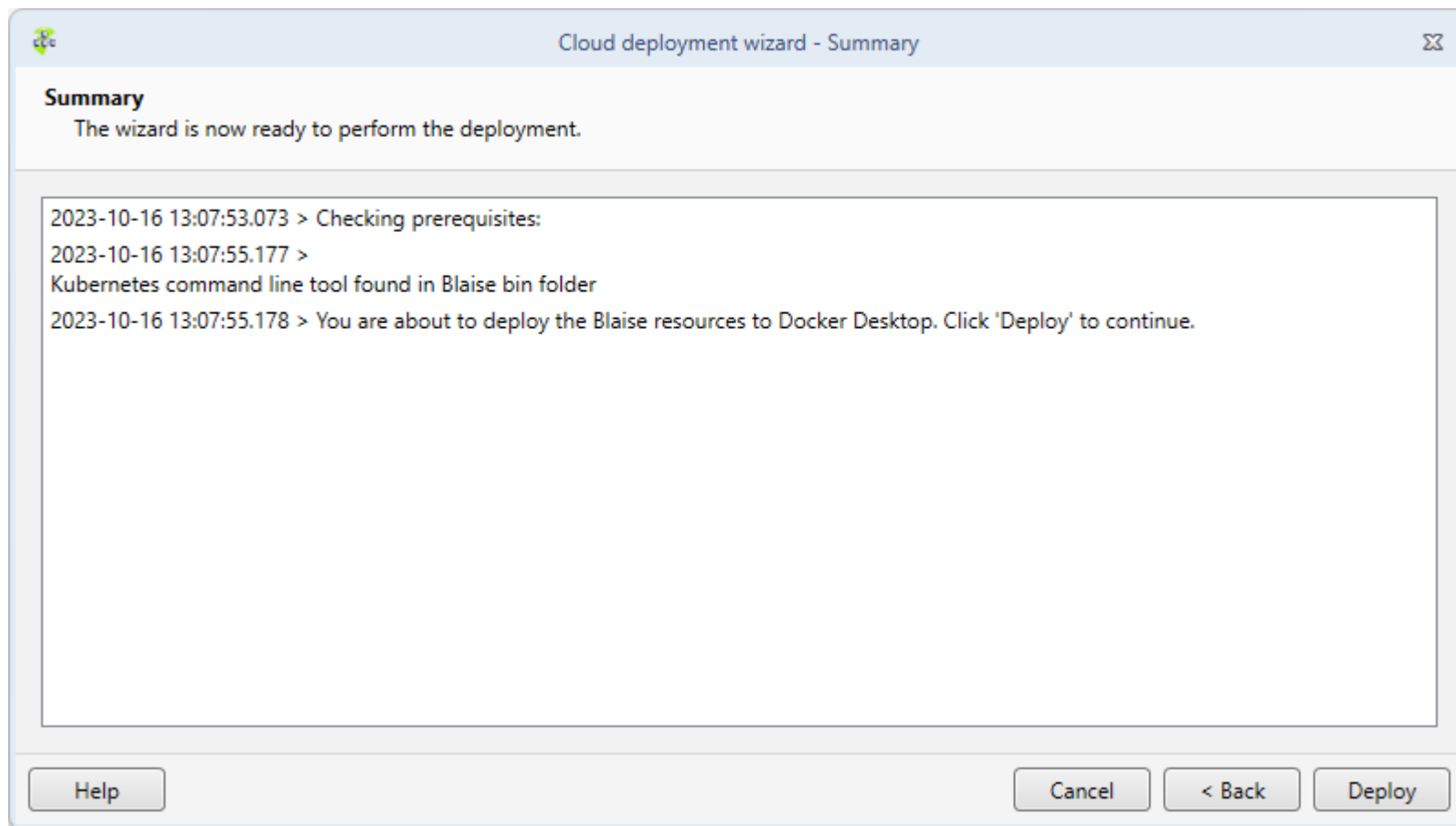
IP Address scope Public Internal Specify accessibility of IP Addresses of installed Surveys

Help Cancel < Back Next >



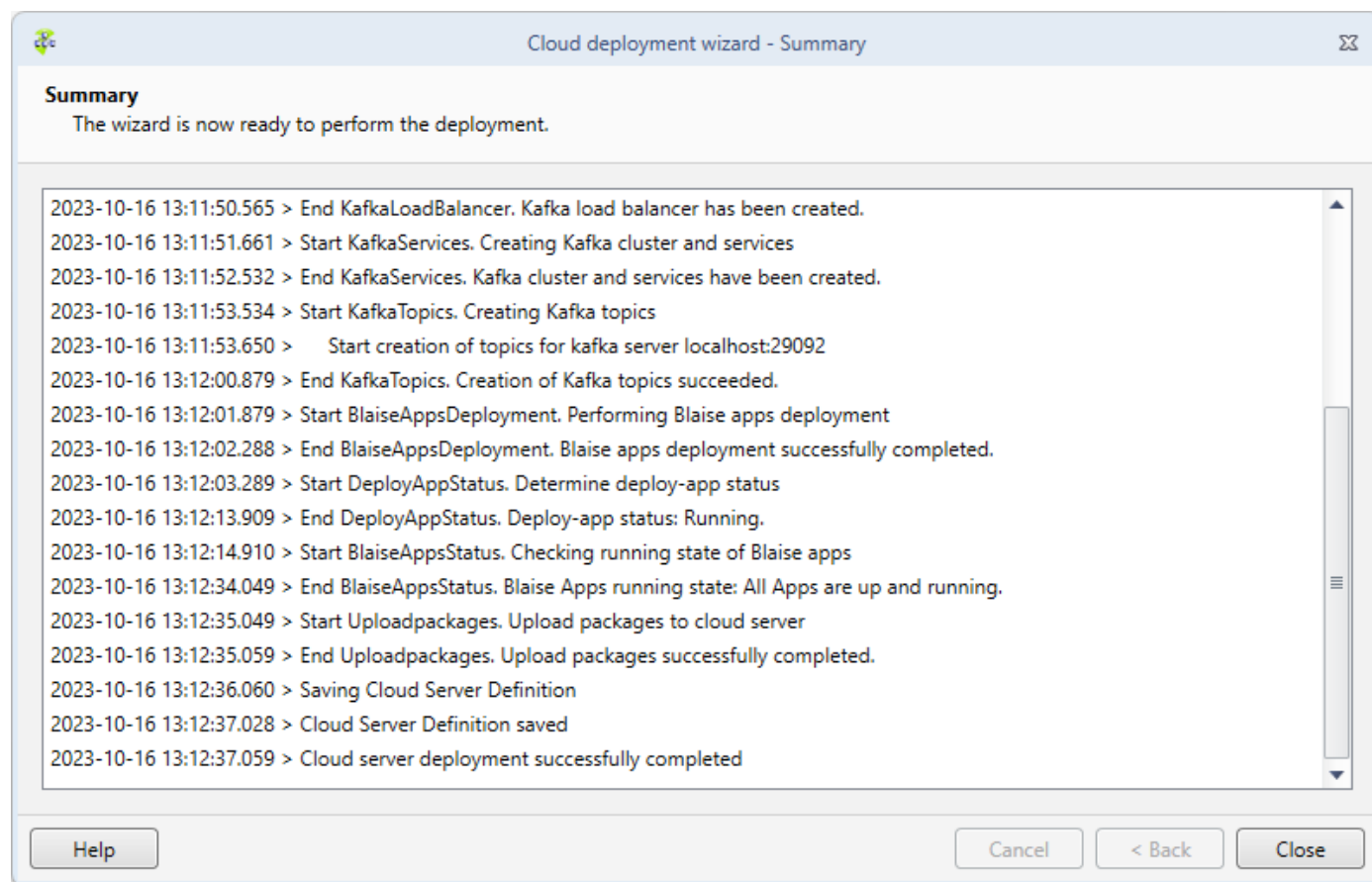
Deployment – Blaise (5)

- Click 'Deploy' to start the deployment



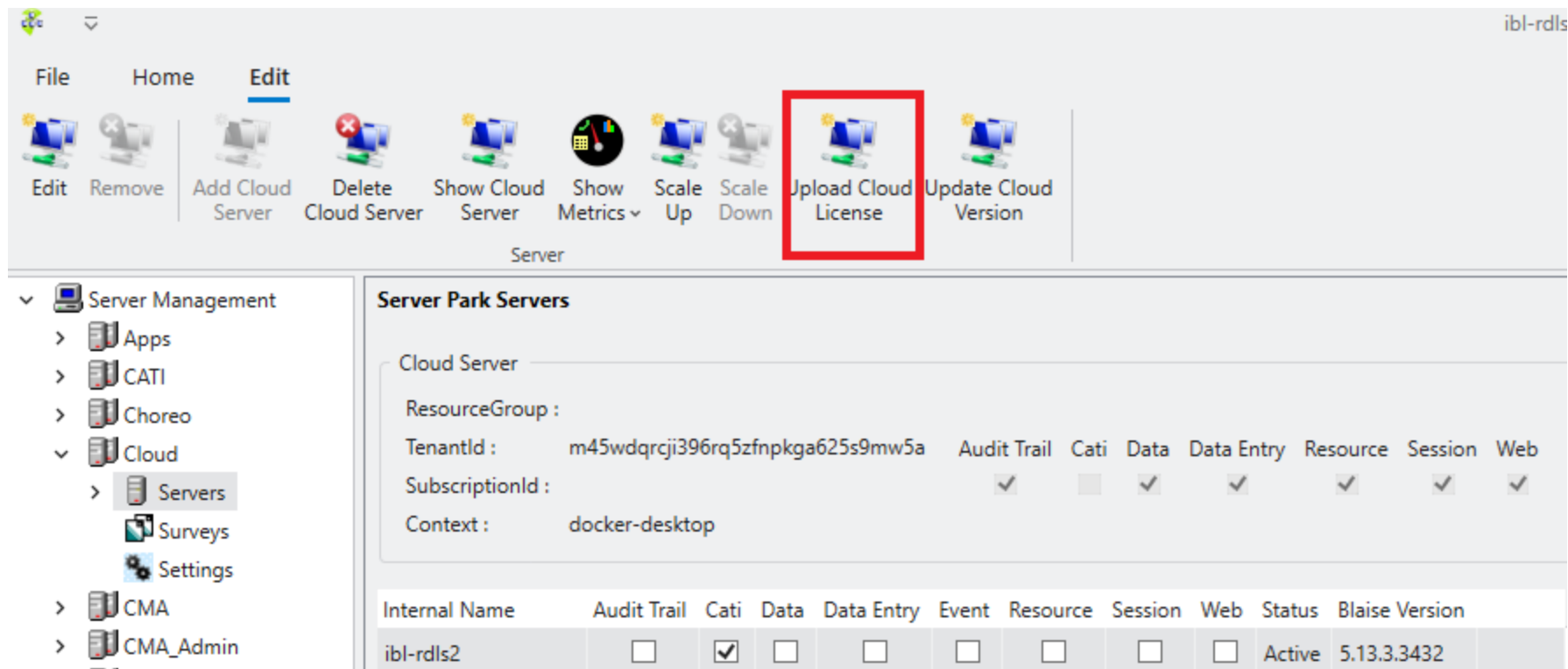
Deployment – Blaise (6)

- View the progress of the deployment and click 'Close' to end the wizard



Deployment – Blaise (7)

- Now the Blaise license key has to be deployed to the cloud version.
- In the ribbon, click on Upload Cloud License



The screenshot shows the Blaise application interface. The ribbon is set to the 'Edit' tab, and the 'Upload Cloud License' button is highlighted with a red box. Below the ribbon, the 'Server Management' pane is visible, showing a tree view with 'Servers' selected. The main area displays the 'Server Park Servers' configuration for a 'Cloud Server'. The configuration includes fields for 'ResourceGroup', 'TenantId', 'SubscriptionId', and 'Context'. Below this, a table lists the server's internal name and various service statuses.

Internal Name	Audit Trail	Cati	Data	Data Entry	Event	Resource	Session	Web	Status	Blaise Version
ibl-rdls2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Active	5.13.3.3432



Deployment – Blaise (8)

- Demo
 - Deployment Blaise on Docker Desktop
 - Upload Blaise License



Deploy a (web) survey to the cloud (1)

- Create a (web) survey in the Control Centre
- Right click the project, select Edit Project and set the 'Supported Web Data Entry Client' to: Cloud

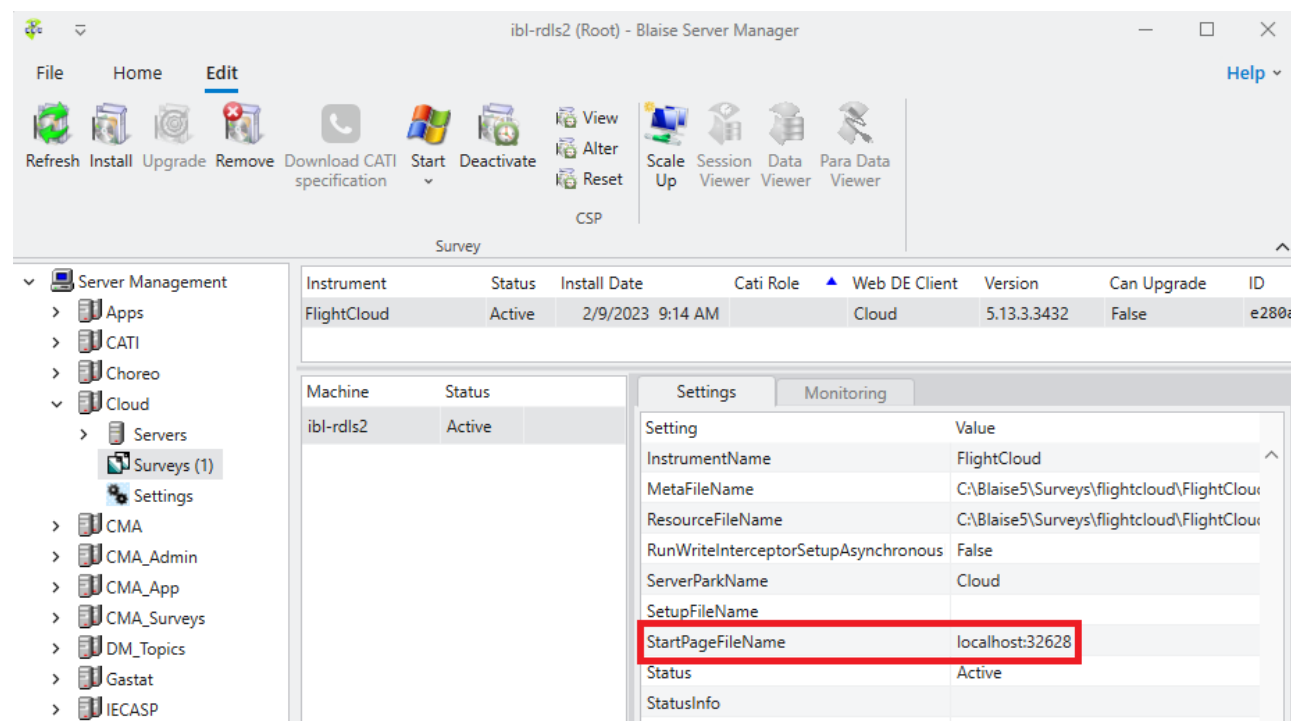
The screenshot shows the Visual Studio IDE with a data model project named 'FlightCloud'. The main window displays the data model code for 'FlightSurvey', including fields like 'Person.IDNumber' and 'Person.FirstName'. The 'Edit Data model Project' dialog is open, showing the following configuration:

- Project Name: FlightCloud
- File name: C:\Users\Ralph\Documents\Blaise5\FlightCloud\FlightCloud.bproj
- Main file: FlightCloud.blax
- Guid: e280a023-9653-4366-b218-f870b24c4a47
- Survey Root: (empty)
- Resource Database: FlightCloud.blrd
- App Support: On
- Is runnable survey:
- Call Role: None
- Use CAR:
- Supported Web Data Entry Client: Cloud



Deploy a (web) survey to the cloud (2)

- Install the survey in the cloud server park



The screenshot shows the Blaise Server Manager interface for the server 'ibl-rdls2'. The 'Survey' section is active, displaying a table of installed surveys and a settings panel for the selected 'FlightCloud' survey.

Instrument	Status	Install Date	Cati Role	Web DE Client	Version	Can Upgrade	ID
FlightCloud	Active	2/9/2023 9:14 AM		Cloud	5.13.3.3432	False	e280e

Machine	Status
ibl-rdls2	Active

Setting	Value
InstrumentName	FlightCloud
MetaFileName	C:\Blaise5\Surveys\flightcloud\FlightClou
ResourceFileName	C:\Blaise5\Surveys\flightcloud\FlightClou
RunWriteInterceptorSetupAsynchronous	False
ServerParkName	Cloud
SetupFileName	
StartPageFileName	localhost:32628
Status	Active
StatusInfo	

- If everything went well, you should see a StartPageFileName pointing to the cloud-address
- Now you can test it from the start-button in the Ribbon



Deploy a (web) survey to the cloud (3)

- Demo
 - Deployment of Flight Survey
 - Start survey
 - Deployment of Leisure Survey
 - Start survey



Monitoring – Check running state (1)

- Use 'Show Cloud Server'

The screenshot shows the Blaise Server Manager interface. The 'Show Cloud Server' button is highlighted with a red box. A dialog box titled 'Status of Blaise resources and services in Kubernetes cluster 'docker-desktop'' is open, displaying a table of services and pods. The 'PODS' table has a red box around its columns, and the 'DEPLOYMENTS' table is also visible.

Cluster Details

SERVICES	NAME	TYPE	CLUSTER-IP	EXTERNAL-IP	PORT(S)	AGE
data-entry-service	data-entry-service	ClusterIP	10.107.228.191	<none>	9099/TCP	34m
data-service	data-service	ClusterIP	10.96.115.213	<none>	9099/TCP	34m
deploy-service	deploy-service	ClusterIP	10.111.13.198	<none>	9092/TCP	34m

NODES	NAME	STATUS	ROLES	AGE	VERSION
docker-desktop	docker-desktop	Ready	control-plane	69d	v1.25.2

PERSISTENT VOLUME	NAME	CAPACITY	ACCESS MODES	RECLAIM POLICY	STATUS	CLAIM	STORAGECLASS	REASON	AGE
package-pv	package-pv	1Gi	RWX	Retain	Bound	blaise-5-10/package-pvc	hostpath		34m

PERSISTENT VOLUME CLAIM	NAME	STATUS	VOLUME	CAPACITY	ACCESS MODES	STORAGECLASS	AGE
package-pvc	package-pvc	Bound	package-pv	1Gi	RWX	hostpath	34m

PODS	NAME	READY	STATUS	RESTARTS	AGE
audittrail-deployment-6b4d7fbb64-mvsj5	audittrail-deployment-6b4d7fbb64-mvsj5	1/1	Running	0	34m
classification-deployment-7e346e45b9-2wgtq	classification-deployment-7e346e45b9-2wgtq	1/1	Running	0	34m
data-deployment-768577688b-5m8gj	data-deployment-768577688b-5m8gj	1/1	Running	0	34m
data-entry-deployment-675d9e9cf5-49222	data-entry-deployment-675d9e9cf5-49222	1/1	Running	0	34m
deploy-deployment-69dd4989c9-7fvzn	deploy-deployment-69dd4989c9-7fvzn	1/1	Running	0	34m
resource-deployment-7bb44d677f-jk83m	resource-deployment-7bb44d677f-jk83m	1/1	Running	0	34m
session-deployment-57587df469-w17nf	session-deployment-57587df469-w17nf	1/1	Running	0	34m

DEPLOYMENTS	NAME	READY	UP-TO-DATE	AVAILABLE	AGE
audittrail-deployment	audittrail-deployment	1/1	1	1	34m
classification-deployment	classification-deployment	1/1	1	1	34m
data-deployment	data-deployment	1/1	1	1	34m
deploy-deployment	deploy-deployment	1/1	1	1	34m
resource-deployment	resource-deployment	1/1	1	1	34m
session-deployment	session-deployment	1/1	1	1	34m



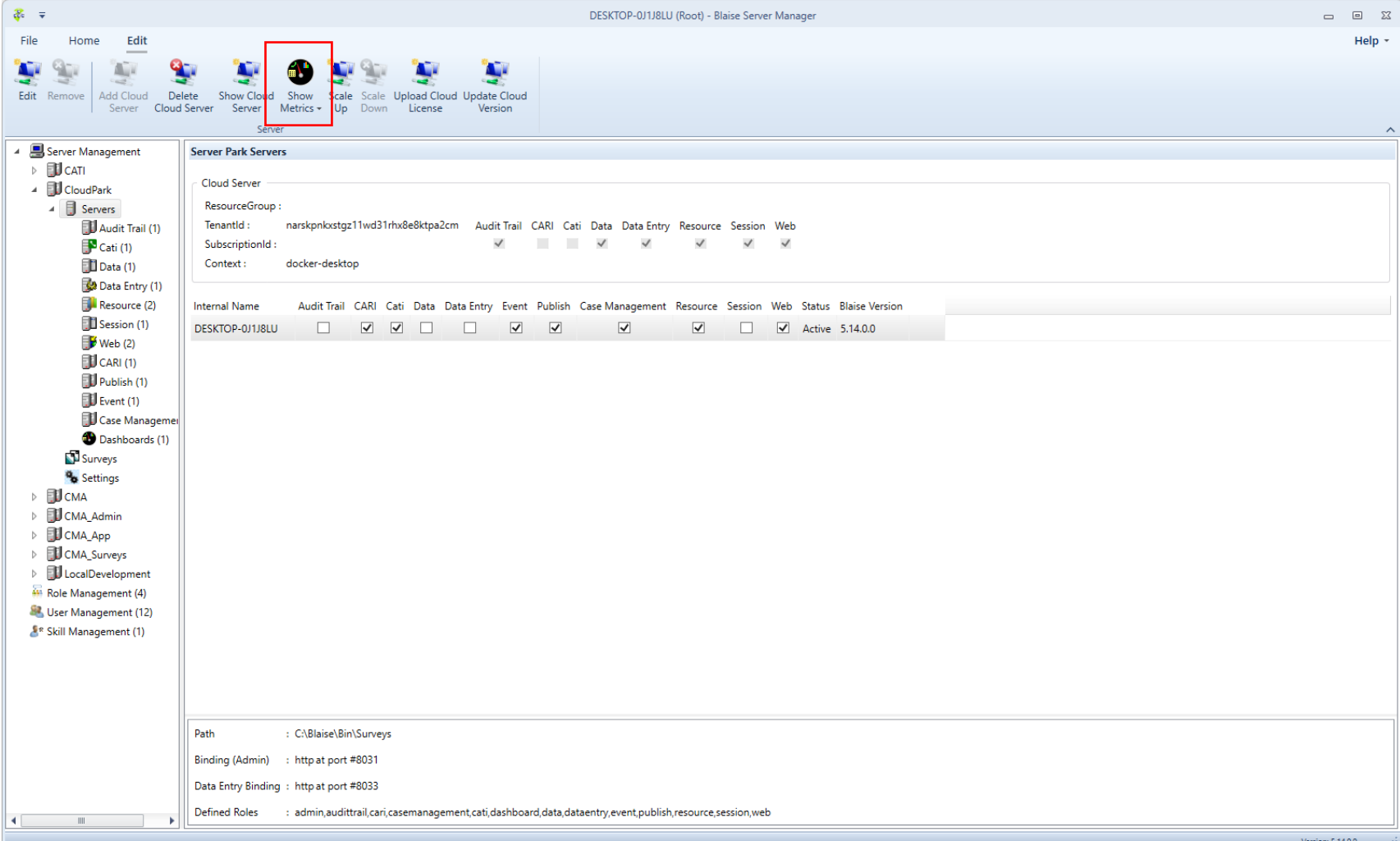
Monitoring - Check running state (2)

- Use Kubectl command line
- Some useful commands:
 - `kubectl get all --all-namespaces`
 - `kubectl get nodes`
 - `kubectl get pv`
 - `kubectl get pvc -n <name space name> or --all-namespaces`
 - `kubectl describe pod <pod name> -n <name space name>`
 - `kubectl logs <pod name> -n <name space>`



Monitoring - Check running state (3)

- Use 'Show Metrics'
- This option is only available if you
- chose to 'Deploy Metrics' in the cloud
- Deployment wizard
- During the deployment 3 Grafana
- dashboards will be installed



DESKTOP-0J1J8LU (Root) - Blaise Server Manager

File Home Edit

Edit Remove Add Cloud Server Delete Cloud Server Show Cloud Server **Show Metrics** Scale Up Scale Down Upload Cloud License Update Cloud Version

Server Management

- CloudPark
 - Servers
 - Audit Trail (1)
 - Cati (1)
 - Data (1)
 - Data Entry (1)
 - Resource (2)
 - Session (1)
 - Web (2)
 - CARI (1)
 - Publish (1)
 - Event (1)
 - Case Management (1)
 - Dashboards (1)
- Surveys
- Settings
 - CMA
 - CMA_Admin
 - CMA_App
 - CMA_Surveys
 - LocalDevelopment
- Role Management (4)
- User Management (12)
- Skill Management (1)

Server Park Servers

Cloud Server

ResourceGroup :

TenantId : narskpnkstgz11wd31rhx8e8ktpa2cm Audit Trail CARI Cati Data Data Entry Resource Session Web

SubscriptionId :

Context : docker-desktop

Internal Name	Audit Trail	CARI	Cati	Data	Data Entry	Event	Publish	Case Management	Resource	Session	Web	Status	Blaise Version
DESKTOP-0J1J8LU	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Active	5.14.0.0

Path : C:\Blaise\Bin\Surveys

Binding (Admin) : httpat port #8031

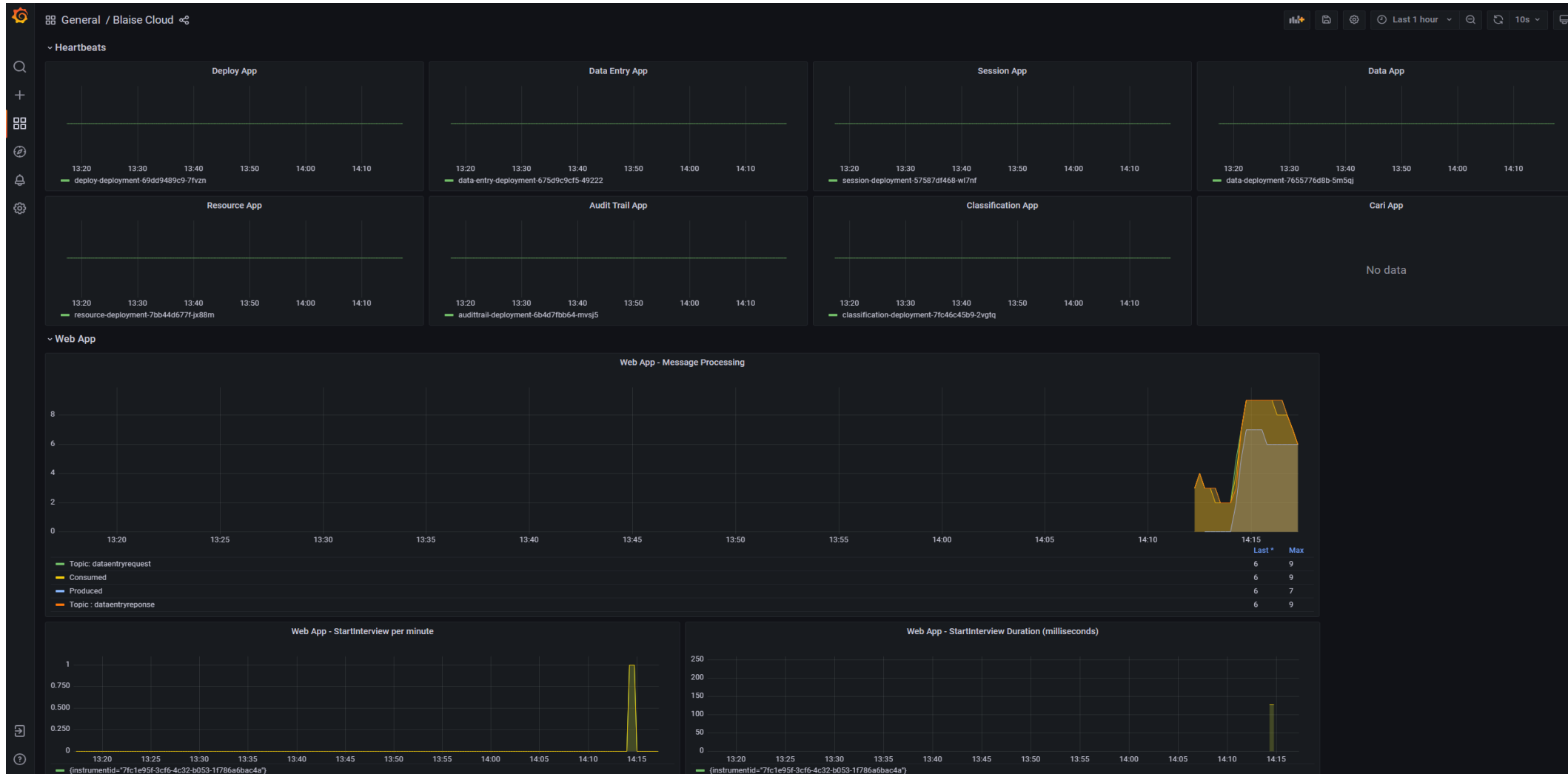
Data Entry Binding : httpat port #8033

Defined Roles : admin,audittrail,cari,casemanagement,cati,dashboard,data,dataentry,event,publish,resource,session,web

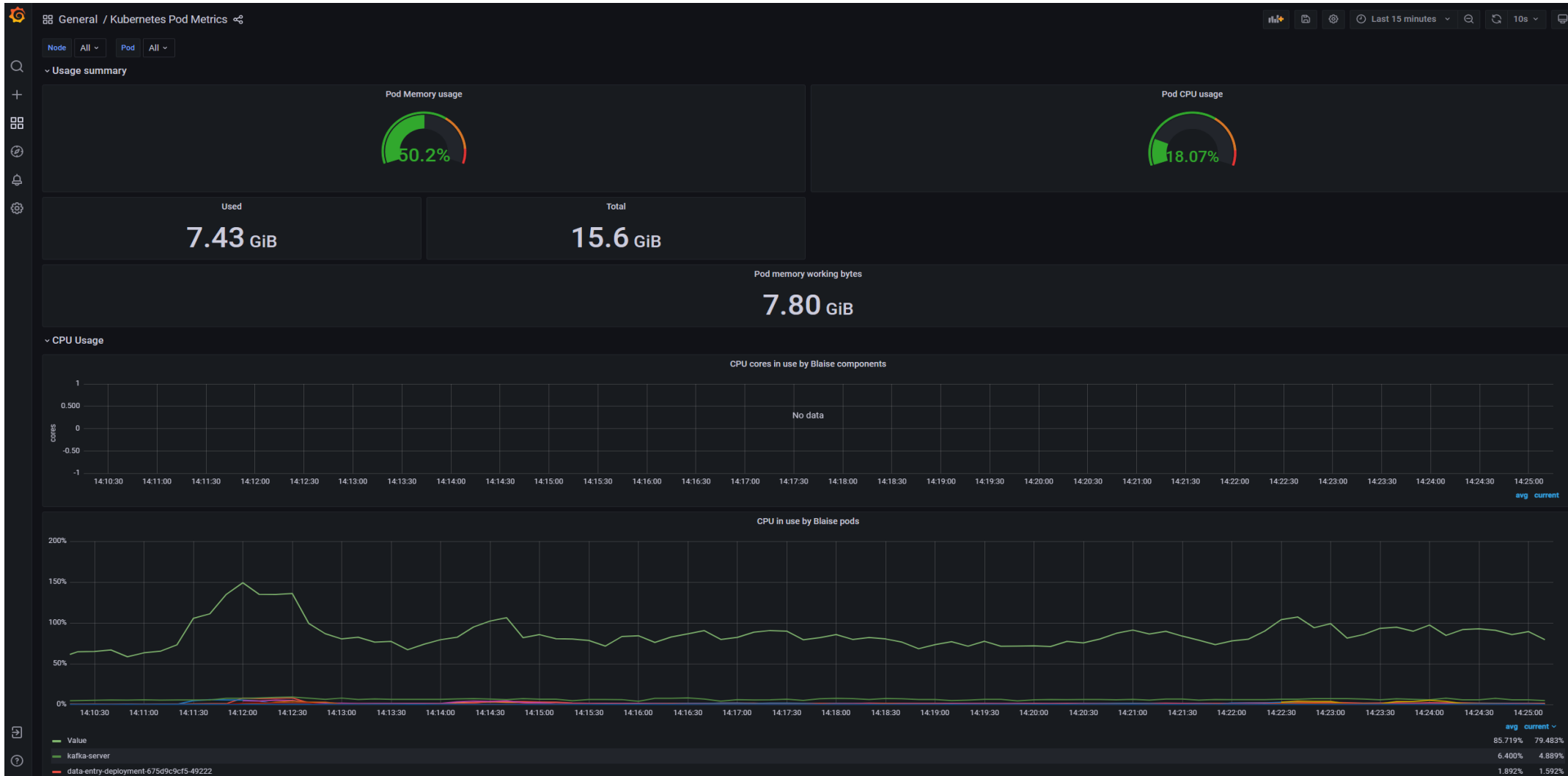
Version: 5.14.0.0



Grafana (1) – Blaise Cloud dashboard



Grafana (2) – Kubernetes Pod Metrics



Grafana (3) – Kafka Metrics



Monitoring

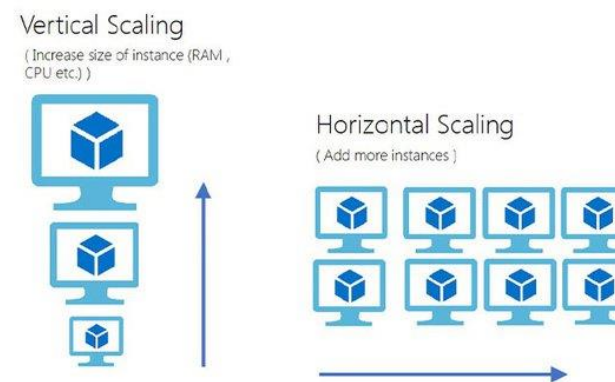
- Demo
 - ServerManager: Show Cloud Server
 - Usage Kubectl
 - ServerManager: Show Metrics
 - Blaise Cloud Dashboard
 - Kubernetes Pod Metrics
 - Kafka Metrics



Scaling (1)

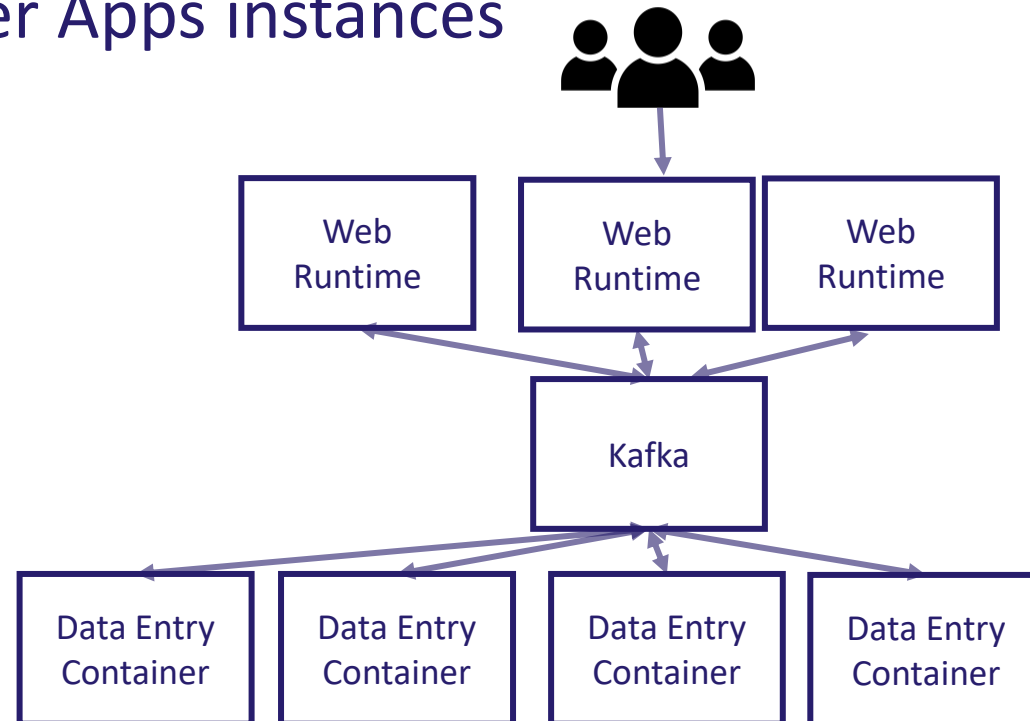
- Cloud: Dynamic allocation of resources
- Vertical vs Horizontal
 - Vertical scaling: add more compute power to your existing nodes
 - Horizontal scaling: add more compute power by adding instances

- Blaise system supports horizontal
- The cloud provider supports vertical



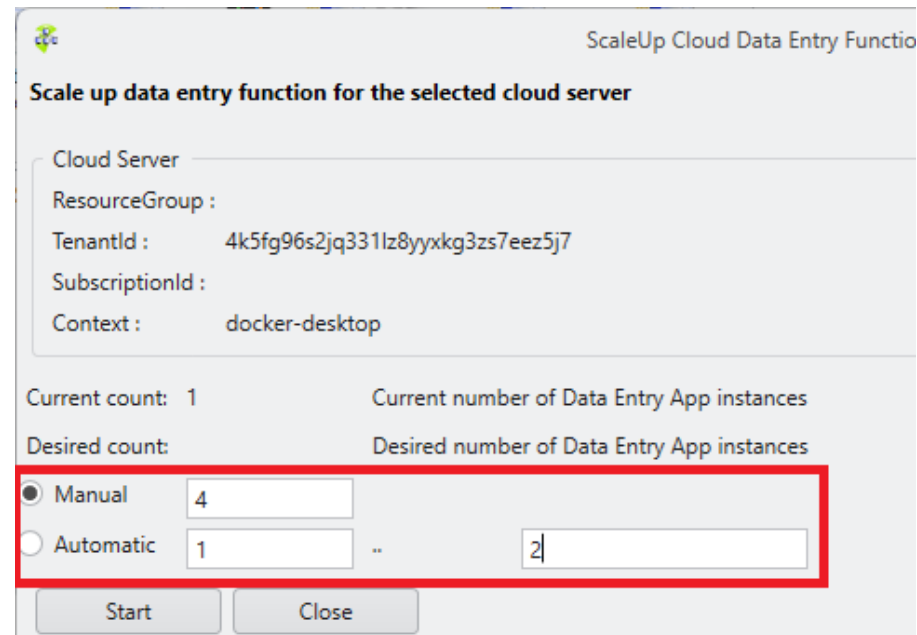
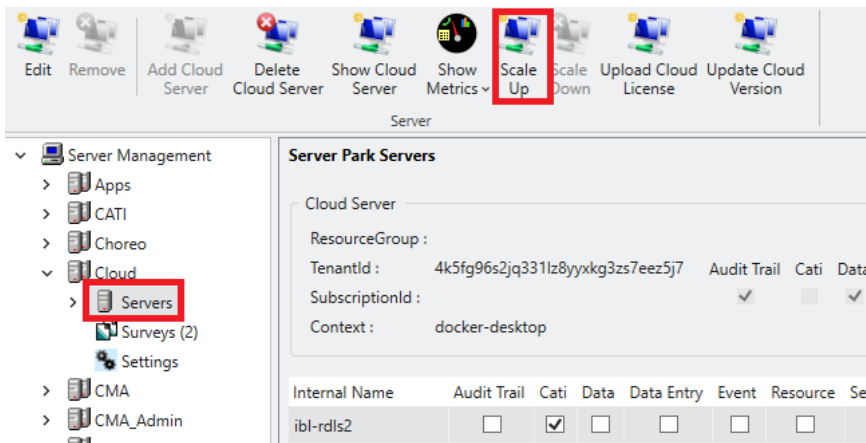
Scaling (2)

- Blaise supports scaling in Server Manager
- Data Entry Container apps (automatic or manually)
- Web Survey Container Apps instances



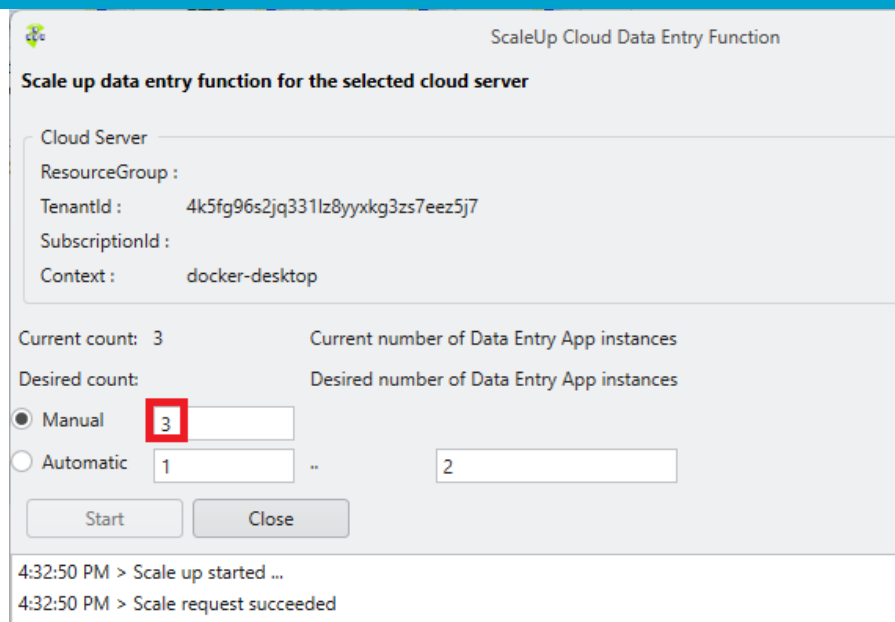
Scaling in the Server Manager

- Data Entry: choose 'Servers' and click on 'Scale Up'
 - Manual : Instruct Kubernetes to Create/Remove instances of a pod
 - Automatic: Use Kubernetes 'HorizontalPodAutoscaler' functionality to Create/Remove instances
 - `--cpu-percent=70% --minPods=1 --maxPods=2`



Scaling Data Entry - Kubectl

- Scale up Data Entry



ScaleUp Cloud Data Entry Function

Scale up data entry function for the selected cloud server

Cloud Server

ResourceGroup :

TenantId : 4k5fg96s2jq331lz8yyxkg3zs7eez5j7

SubscriptionId :

Context : docker-desktop

Current count: 3 Current number of Data Entry App instances

Desired count: Desired number of Data Entry App instances

Manual

Automatic ..

Start Close

4:32:50 PM > Scale up started ...

4:32:50 PM > Scale request succeeded

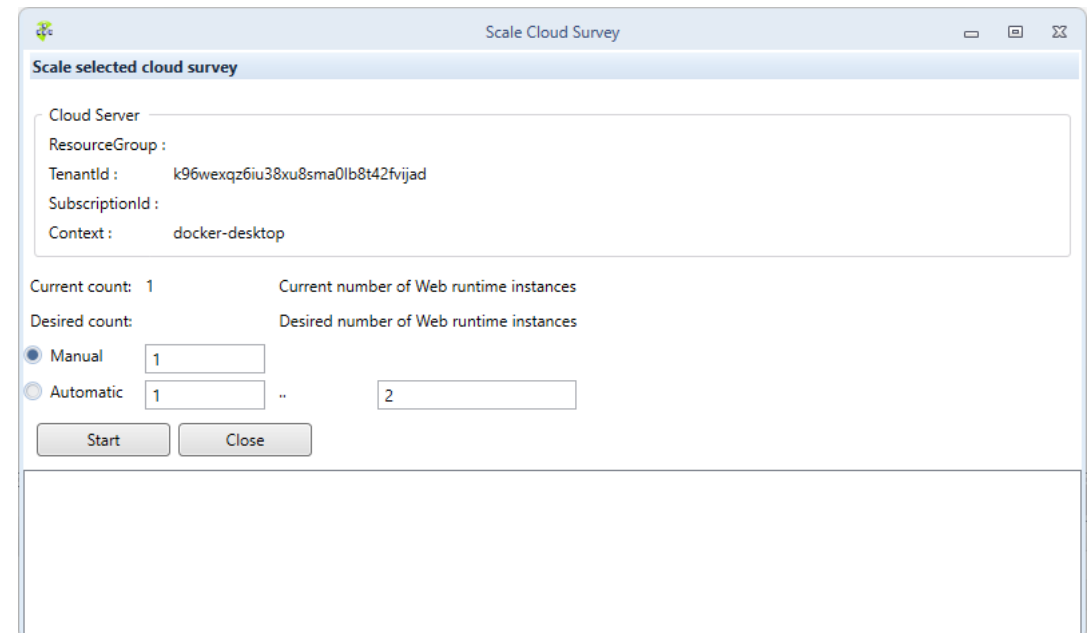
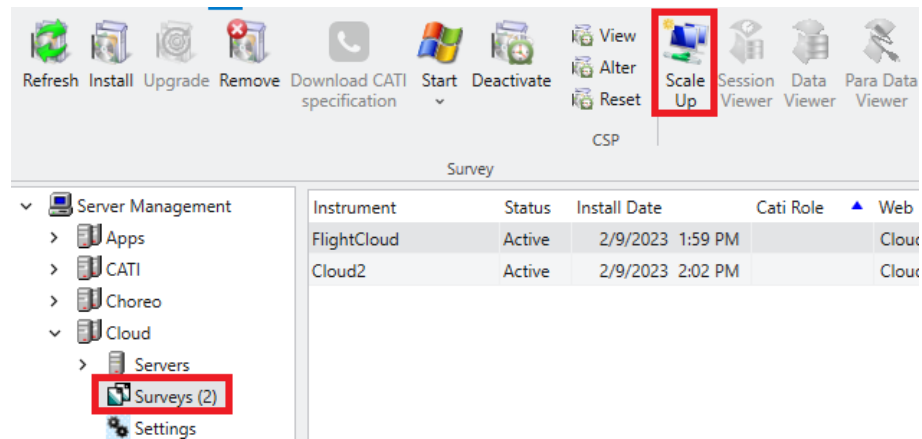
- Check with command: Kubectl get all --all-namespaces

```
blaise-5-13 pod/cari-deployment-854d55fdc7-lrv8n 1/1 Running 0 145m
blaise-5-13 pod/classification-deployment-5ff74c47b-nktfb 1/1 Running 0 145m
blaise-5-13 pod/cloud2-web-deployment-7c66dd945d-cmrlw 1/1 Running 0 141m
blaise-5-13 pod/data-deployment-857d5c495f-6s2xp 1/1 Running 0 145m
blaise-5-13 pod/data-entry-deployment-8474585cd-b5rgh 1/1 Running 0 79s
blaise-5-13 pod/data-entry-deployment-8474585cd-flvmt 1/1 Running 0 145m
blaise-5-13 pod/data-entry-deployment-8474585cd-ns9qk 1/1 Running 0 79s
blaise-5-13 pod/deploy-deployment-64fc776f94-fwp7d 1/1 Running 0 145m
blaise-5-13 pod/flightcloud-web-deployment-6784c495bc-75v9b 1/1 Running 0 144m
blaise-5-13 pod/resource-deployment-5866f6f46-sgx28 1/1 Running 0 145m
```



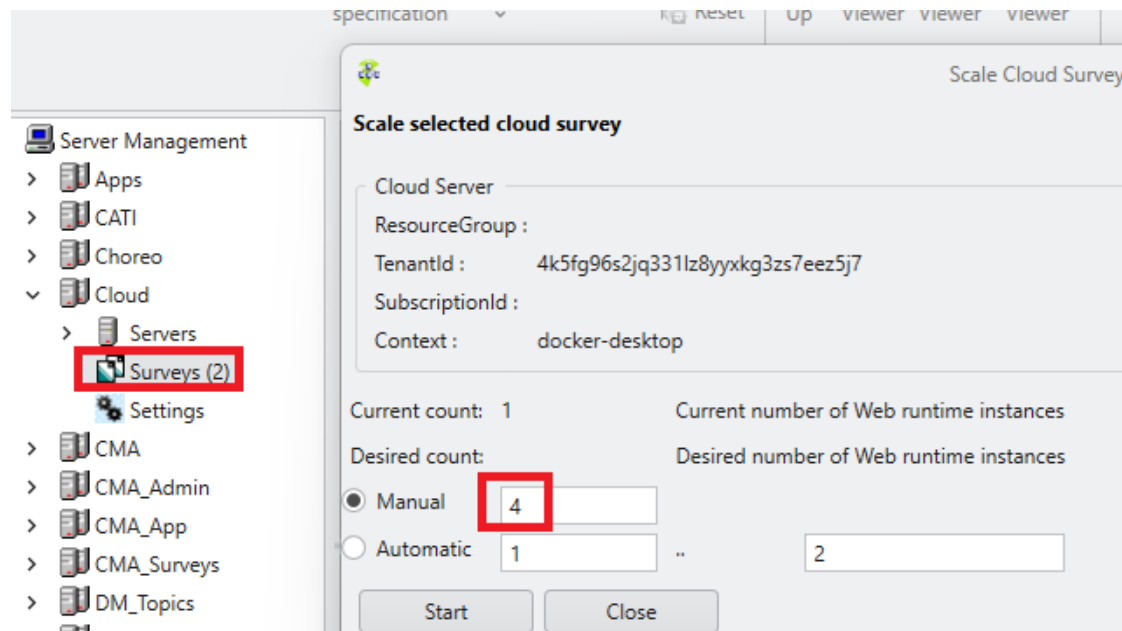
Scaling in the Server Manager

- Web: choose 'Surveys' and click the button 'Scale Up'
 - Manual : Instruct Kubernetes to Create/Remove instances of a pod
 - Automatic: Use Kubernetes 'HorizontalPodAutoscaler' functionality to Create/Remove instances
 - `--cpu-percent=70% --minPods=1 --maxPods=2`



Scaling Web- Kubectl

- Scale up Web



- Check with command: Kubectl get all --all-namespaces

```
blaise-5-13 pod/flightcloud-web-deployment-6784c495bc-5m2td 0/1 Running 0 4s
blaise-5-13 pod/flightcloud-web-deployment-6784c495bc-75v9b 1/1 Running 0 18h
blaise-5-13 pod/flightcloud-web-deployment-6784c495bc-rjlqc 0/1 ContainerCreating 0 4s
blaise-5-13 pod/flightcloud-web-deployment-6784c495bc-tt24m 0/1 Running 0 4s
```



Scaling

- Demo
 - Scale Up – Data Entry instances
 - Scale Up – Web Survey instances



Update Blaise in the Cloud (1)

- Blaise updates:
 - Update a web runtime to a minor version
 - Update a complete park to a newer minor version
 - Up to 5.11 the system only updates the default Blaise apps
 - From 5.12 the system also automatically update the running instances of the web-runtime
 - Update a side by side installation



Update Blaise in the Cloud (2)

- How to see in kubectl what the minor version is?
 - E.g. take the data-entry-pod in the namespace blaise-5-13

```
blaise-5-13 pod/cloud2-web-deployment-7c66dd945d-cmrlw
blaise-5-13 pod/data-deployment-857d5c495f-6s2xp
blaise-5-13 pod/data-entry-deployment-8474585cd-flvmt
blaise-5-13 pod/deploy-deployment-64fc776f94-fwp7d
```

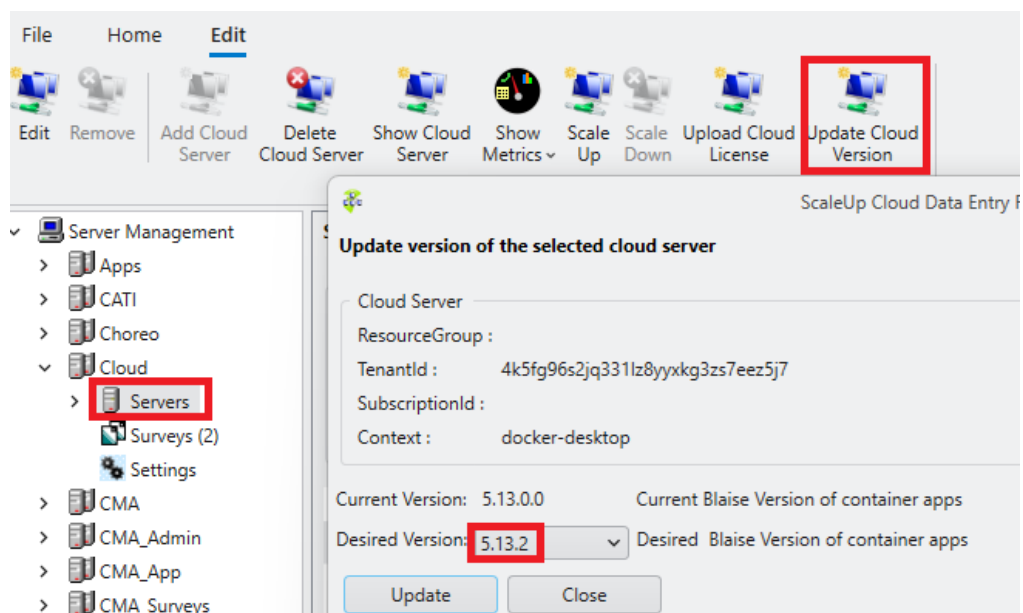
- kubectl describe pod/data-entry-deployment-8474585cd-flvmt -n blaise-5-13

```
Containers:
  data-entry-app:
    Container ID:   docker://d4efa801313ea437886298ae6b723e8
    Image:          blaiseCBS/dataentry:5.13.0
    Image ID:      docker-pullable://blaiseCBS/dataentry@sh
```



Update Blaise in the Cloud (3)

- Update the Blaise version (upgrade / downgrade)



```
Containers:
  data-entry-app:
    Container ID:   docker://b6055ddaf9af98d61ea704b0cbb8a7c45
    Image:         blaiseCBS/dataentry:5.13.2
    Image ID:     docker-pullable://blaiseCBS/dataentry@sha256:da3090bb1
```



Update Blaise in the cloud (4)

- Demo
 - Update Blaise version



Side-by-side installation

- Allow to install multiple Blaise Versions in one Kubernetes Cluster
 - For instance:
 - Blaise 5.12
 - Blaise 5.13
 - Each Blaise version has its own:
 - Namespace for Blaise Container Apps
 - Storage (Persistent Volume Claim)
 - Message channels (Kafka Topics)



Security (1)

- Subjects that play a role in setting up security for the Blaise Cloud solution are:
 - Communication protocols being used e.g. http, https, tcp
 - Ports being used and exposed
 - User credentials required for accessing services & applications
 - Usage of tokens in order to secure user sessions



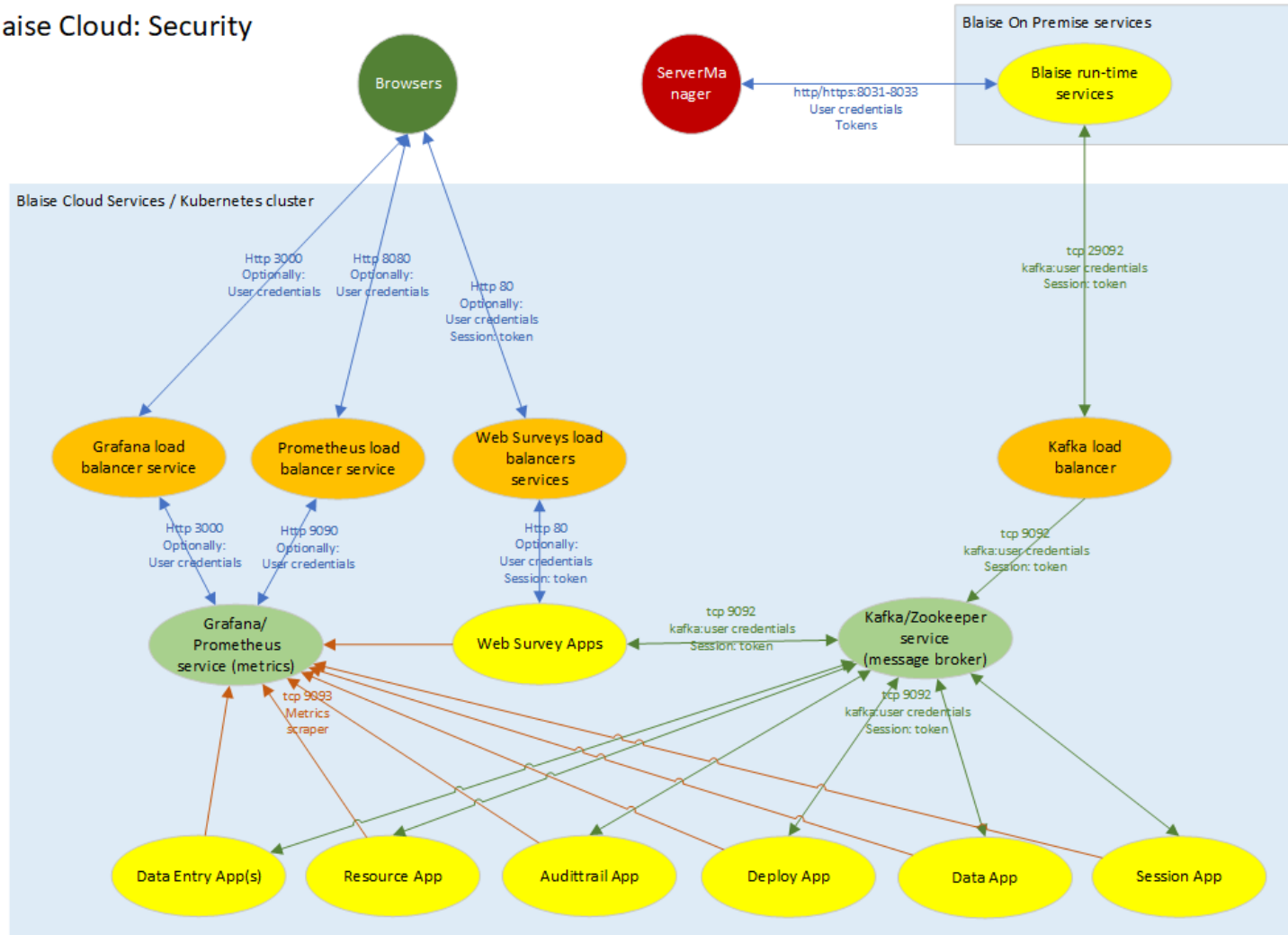
Security (2)

- Blaise cloud solution - Kubernetes
 - Blaise cloud apps expose only those ports that are required for them to run properly
 - Communication between Blaise cloud apps is handled by Kafka
 - Communication between Blaise cloud apps & services and external app & services is handled via load-balancers
 - Blaise cloud apps will only process an incoming message if a valid token is sent in the message header
 - Kafka will only process an incoming message if the sending app provides correct credentials



Security (3)

Blaise Cloud: Security



Security (4)

Kubernetes cluster : Protocols, Port and security

Kind	From/to	From/to	Protocol	Internal port	External port	Secured by	Load balancer
Internal	Blaise cloud app	Blaise cloud app	Tcp Kafka	9092	-	credentials tokens	N
Internal	Blaise cloud app	Prometheus (metrics) service	http	9093	-	-	N
External	Blaise run-time services on prem	Blaise cloud app	tcp Kafka	9092	29092	credentials tokens	Y
External	Browsers	Blaise cloud web apps	http	80	80	tokens optionally: credentials	Y
External	Browsers	Grafana service	http	3000	3000	optionally: credentials	Y
External	Browsers	Prometheus service	http	9090	8080	optionally: credentials	Y



Troubleshooting Deployment (1)

Cloud Installation

- How is Blaise cloud solution deployed by ServerManager?
 - Usage of template cmd / yaml script files
 - YAML configuration files are used for creating and configuring components in Kubernetes cluster
 - The template files contain placeholders which are actually being replaced by real values during installation/deployment
 - Located in Templates folder of Blaise installation folder
- Actual installation scripts and yaml files which have been created and applied by the ServerManager during deployment
 - Located in user's AppData\Local\Blaise folder
- Kube context
 - Context point to a certain Kubernetes cluster and contains the corresponding connection details
 - Located in config file in user's .kube folder



Troubleshooting Deployment (2)

- All the scripts that Blaise runs are located C:\Users\\AppData\Local\Blaise

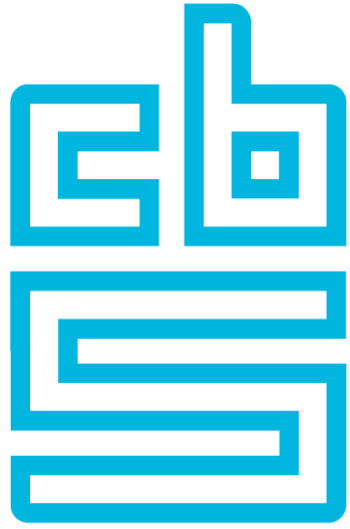
```
apps-deployment.yml
clusterrole.yml
config-map.yml
create-kafka-loadbalancer.cmd
create-kafka-loadbalancer.yml
create-kafka-services.cmd
create-kafka-services.yml
daemonset.yml
delete-kubernetes-volume.cmd
deploy-blaise-apps.cmd
deploy-kubernetes-volume.cmd
deploy-metrics.cmd
fileshare-pv.yml
fileshare-pvc.yml
grafana-datasource-config.yml
grafana-deployment.yml
```

```
grafana-deployment-template.yml
grafana-service.yml
jmx_prometheus_javaagent_0_17_2.jar
kafka_2_0_0.yml
kafka-jaas.conf
node-exporter-service.yml
prometheus-deployment.yml
prometheus-service.yml
state-cluster-role.yml
state-cluster-role-binding.yml
state-deployment.yml
state-service.yml
state-service-account.yml
upgrade-blaise-apps.cmd
upload_package.cmd
```





Thank you
for your time



Blaise

Gaining deeper understanding



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