

IBM Cloud Fast Start 2.0

Problem Determination and Troubleshooting

N4ICP001

Steve Mirman – Tim Pouyer –Dave Weilert



Activate to win.

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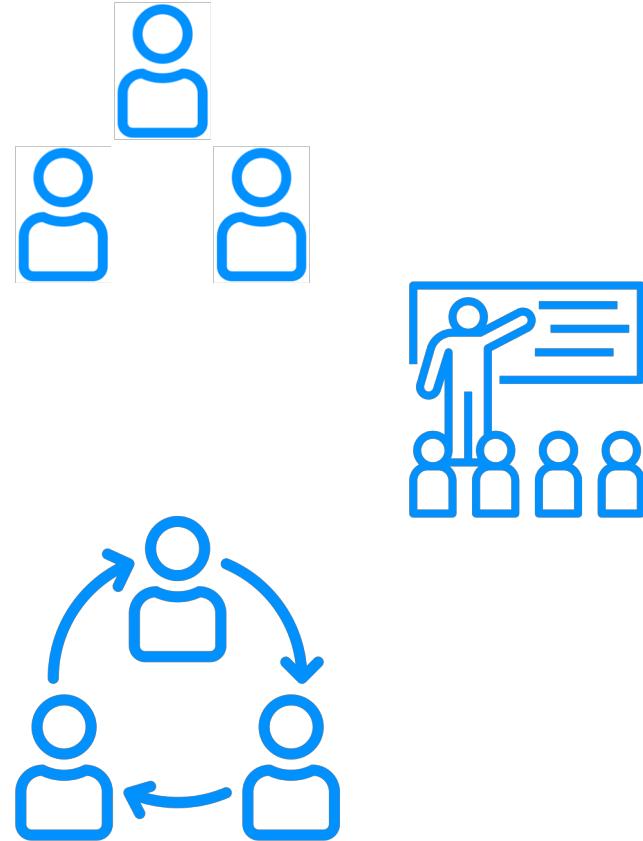
Session Objectives

Attendees will be grouped in **teams** to facilitate collaborative work.

Multiple **lectures** regarding problem determination and troubleshooting will be presented.

Following most lectures will be **hands-on** work that each team collaborates to complete.

Review solutions after each lab.



Teams

Front of room

	A	B	C	D	E	F	
1	aliceblue	burlywood	gold	lime	orange	salmon	1
2	aqua	coral	gray	magenta	orchid	steelblue	2
3	azure	cornsilk	green	maroon	palegreen	tan	3
4	beige	darkgray	indigo	mintcream	pink	teal	4
5	black	darkred	khaki	mistyrose	plum	tomato	5
6	blue	deeppink	lavender	navy	purple	wheat	6
7	brown	firebrick	lightblue	olive	red	yellow	7
	A	B	C	D	E	F	

Team Colors

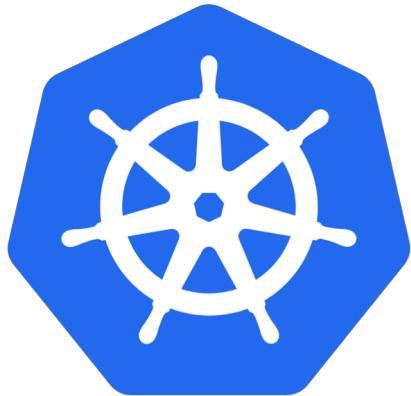
Not in
alphabetic
order

pink
olive
salmon
red
lime
green
teal
aqua
gold
khaki
yellow
coral
orange
blue
lightblue
navy
brown
maroon
tan
wheat
plum

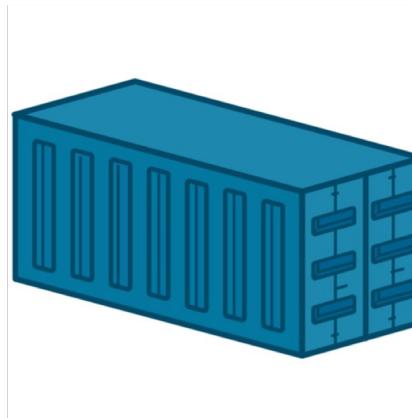
gray
magenta
beige
purple
black
aliceblue
azure
burlywood
cornsilk
darkgray
deeppink
darkred
firebrick
indigo
lavender
mintcream
mistyrose
orchid
tomato
palegreen
steelblue

Not in
alphabetic
order

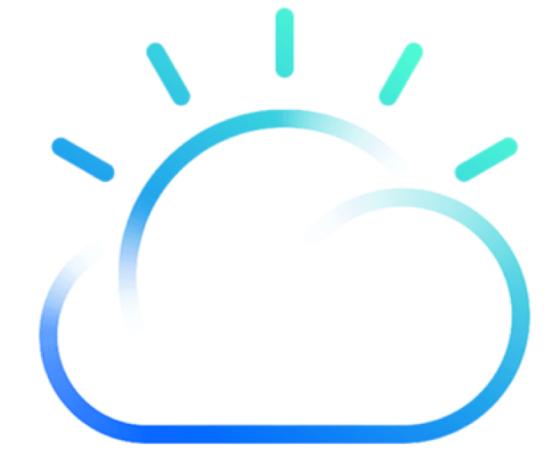
Categories



Kubernetes



Container
based apps



IBM Cloud
Private

Focus will be on these three categories

Lecture

Tools



Tools in “*YOUR*” tool kit



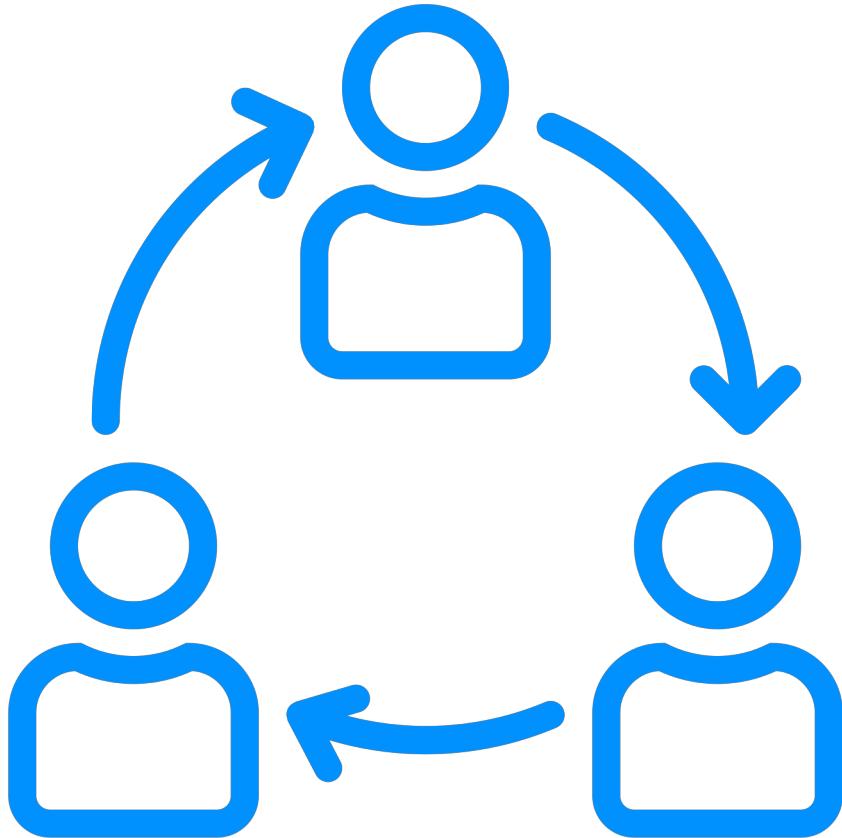
We need tools that give us
answers to our questions!

Tools to be used

- `cloudctl`
- `docker`
- `kubectl`

Lab

Installing Tools



Teams

	A	B	C	D	E	F	
1	aliceblue 30403	burlywood 30827	gold 30700	lime 32572	orange 32754	salmon 31912	1
2	aqua 31307	coral 32514	gray 30707	magenta 32429	orchid 32498	steelblue 32667	2
3	azure 30036	cornsilk 32209	green 32757	maroon 30108	palegreen 31945	tan 30076	3
4	beige 31713	darkgray 31303	indigo 31937	mintcream 30737	pink 31391	teal 30355	4
5	black 31415	darkred 32268	khaki 32011	mistyrose 32766	plum 30143	tomato 32513	5
6	blue 30799	deeppink 30378	lavender 30484	navy 30967	purple 30440	wheat 32692	6
7	brown 30504	firebrick 30479	lightblue 31948	olive 32703	red 30146	yellow 32010	7

Accessing team web site

http://169.62.220.158:{port#}

Team name and color will be shown

The screenshot shows a web page titled "Collector - coral". At the top, there are tabs for "Statistics", "Debug flow", "Questions / Labs, Hints & Answers" (which is selected), "Feedback", and "Information". A colorful logo is in the top right. Below the tabs, the title "Completed Labs" is centered. A table below lists "namespace" and "01" through "10". The "namespace" row has a red arrow pointing to the word "coral" in an orange box. The "01" row has a green checkmark in a red box. The "02" through "10" rows have red circles. The "Cnt" row has a red arrow pointing to the value "0" in an orange box. The entire interface is framed by a blue border.

namespace	01	02	03	04	05	06	07	08	09	10	Cnt
coral	✓	○	○	○	○	○	○	○	○	○	0

Sequence number

Green checkmark
Red circle

- item is completed
- item is waiting to be completed



Collector

Collector - coral

Statistics Debug flow Questions / Labs, Hints & Answers Feedback Information

Completed Labs

namespace	01	02	03	04	05	06	07	08	09	10	Cnt
coral	✓	○	○	○	○	○	○	○	○	○	0

Tracking items

Collector - coral

Statistics Debug flow Questions / Labs, Hints & Answers Feedback Information

Select item from drop down, then press button to retrieve question/lab, hint, or answer.

Filter select item Question/Lab Hint Answer

Button selection and order is tracked

Collector - coral

Statistics Debug flow Questions / Labs, Hints & Answers Feedback Information

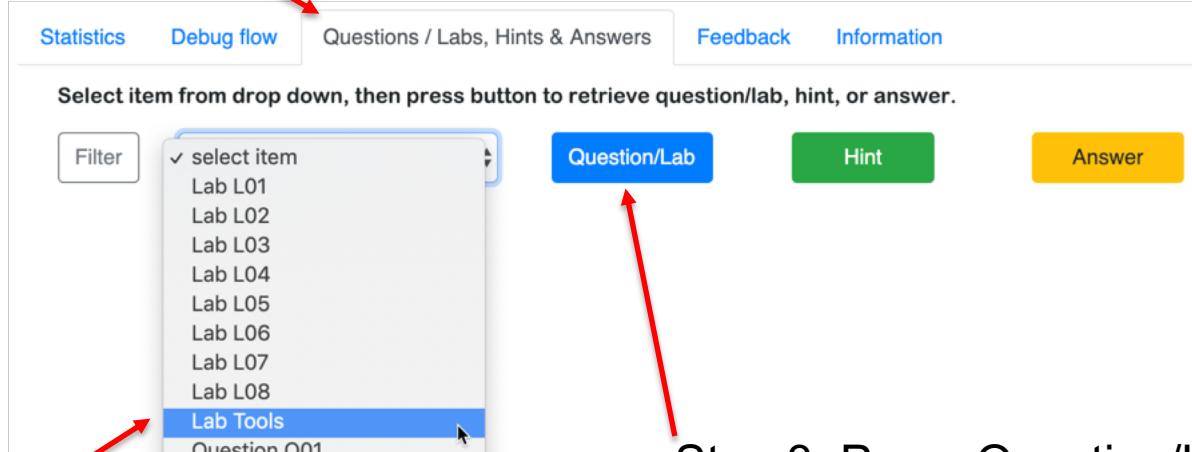
Feedback

Enter feedback in the following section and press Send when complete

Please provide your feedback

Accessing the lab instructions – Option 1

Step 1: Select tab Questions/Labs & Answers



Step 2: Select item Lab Tools

Step 3: Press Question/Lab button

Accessing the lab instructions – Option 2

Step 1: Select tab Information

The screenshot shows a web-based interface titled "Collector - default". At the top, there is a navigation bar with tabs: "Statistics", "Debug flow", "Questions / Labs, Hints & Answers", "Feedback", and "Information". The "Information" tab is highlighted with a blue border. A red arrow points from the text "Step 1: Select tab Information" to this tab. Below the tabs, the text "Select document or link for information" is displayed, followed by a note: "Documents are stored on GitHub. When selected the document or link will open a new browser tab." A list of links is provided:

- Presentation - Powerpoint document
- Presentation - PDF formatted document
- Tools CLI install lab - GitHub link
- Tools CLI install lab - PDF formatted document
- Additional lab resources

A red arrow points from the text "Step 2: Select Tools CLI install lab (either one)" to the fourth item in the list.

Step 2: Select Tools CLI install lab (either one)

Timing labs

Collector

⌚ Remaining time: 0h 29m 56s

Completed Labs

namespace	01	02	03	04	05	06	07	08	09	10
teal	✓	✓	✓	✓						
tan	✓	✓								
red	✓	✓	✓							

When to stop lab work



STOP

Lecture

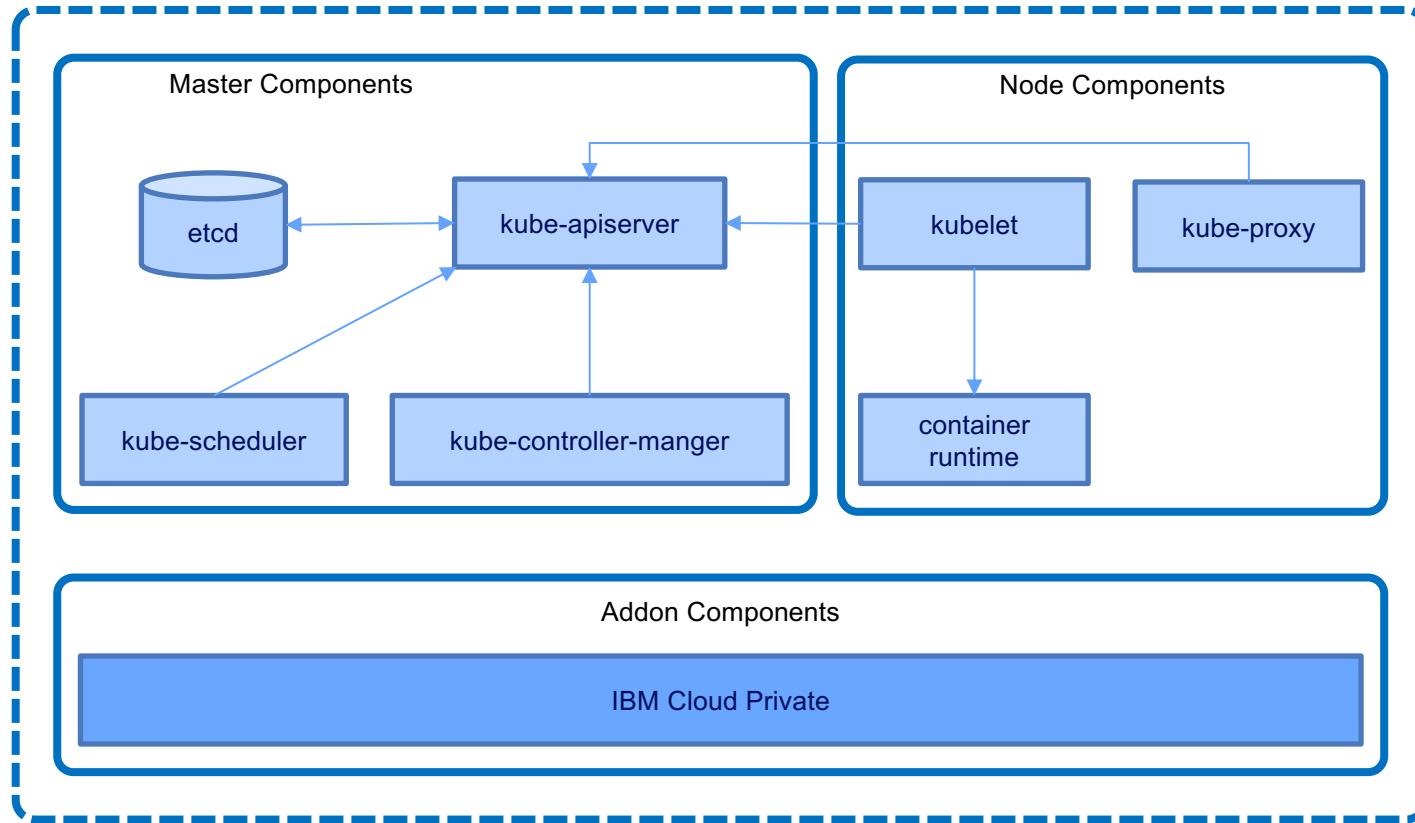
*The “Stack”
&
Kubernetes*



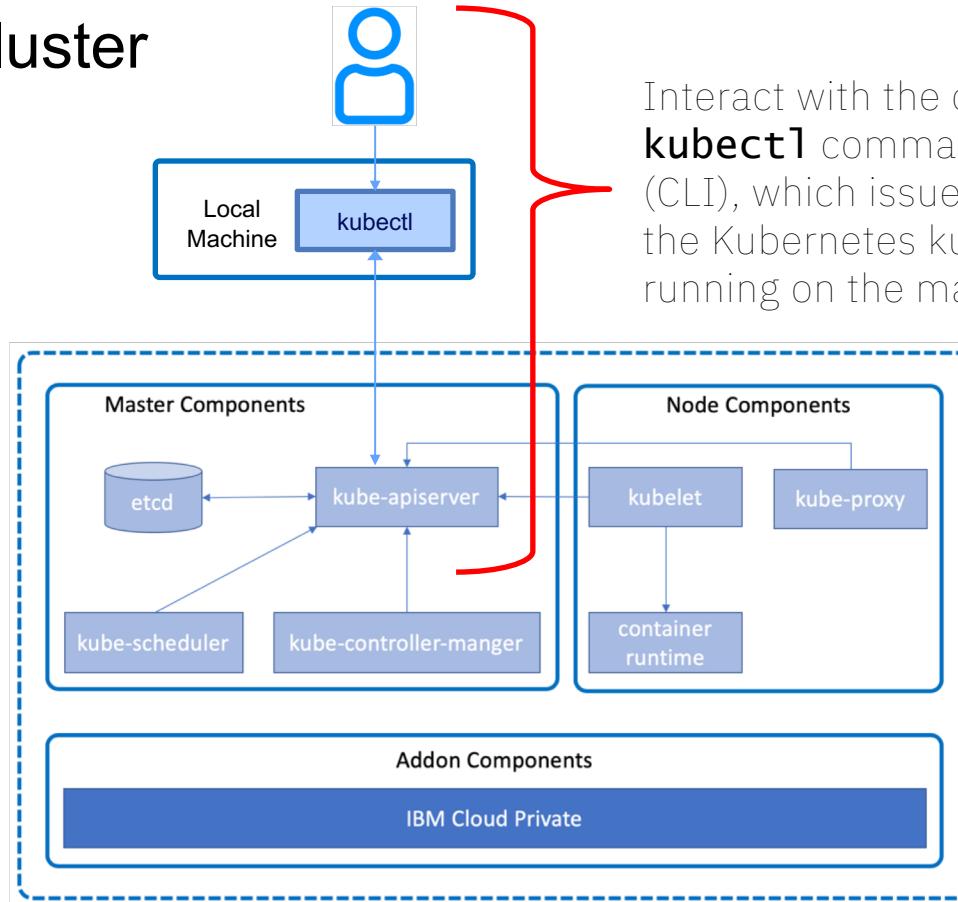
- Application
- Container
- K8 object (pod, deployment, service, etc.)
- Container runtime (Docker, Rocket, etc.)
- Kubernetes
- Network (host, overlay, etc.)
- Operating System (Red Hat, Ubuntu, etc.)
- Hypervisor (VMWare, Nutanix, etc.)
- Hardware (x86, Power, Z)

Understand
the
“stack”

Components that make up a Kubernetes cluster



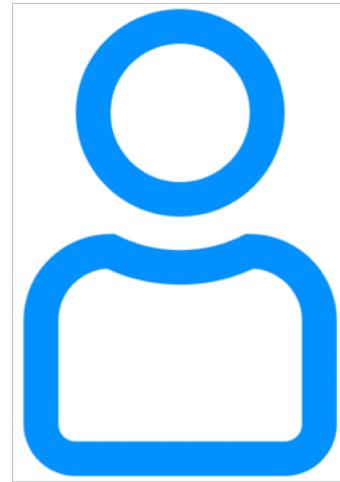
Talking to a cluster



Interact with the cluster through the **kubectl** command line interface (CLI), which issues REST requests to the Kubernetes kube-apiserver running on the master node.

Demo

the Tools



Tools - docker

docker history <image> [--no-trunc]

docker inspect <image>

docker events (example below grabs a time range)

```
dstart=$(date "+%Y-%m-%dT%H:%M:%S")
```

```
docker run ibmcom/icp-inception:3.1.1
```

```
dstop=$(date "+%Y-%m-%dT%H:%M:%S")
```

```
docker events --since $dstart --until $dstop
```

docker run --rm -it --entrypoint=/bin/bash ibmcom/icp-inception:3.1.1

docker stats (will run on a system with multiple containers deployed)

Tools - kubectl

kubectl top [node | pod]

kubectl –n <namespace> get <k8 type>

kubectl –n <namespace> describe <k8 type> <k8 object id>

kubectl –n <namespace> logs [-f] <k8 pod name>

kubectl –n <namespace> exec -it <k8 pod name> [-c <container name>] -- <cmd>

kubectl edit <K8 obj type>/<name>

KUBE_EDITOR="nano" kubectl edit deployment/<name>

Tools - cloudctl

cloudctl login --skip-ssl-validation

- API endpoint> https://169.62.194.213:8443

- Username> admin

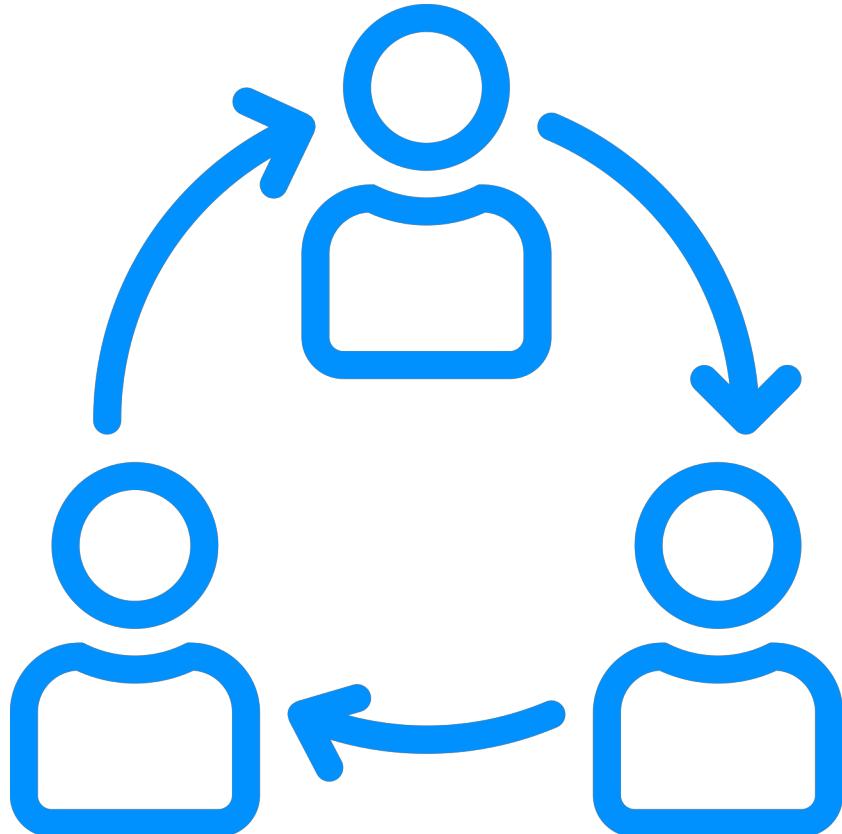
- Password> (secret)

- Select a namespace:
(namespaces will be shown with number)

- Enter a number:<enter the number for your team>

Lab

Using the Tools



Accessing the Questions

Collector tracks all list selections and button presses to gather information that is used to track, understand, and diagnose lab activities

The screenshot shows the 'Collector - black' interface. At the top, there are tabs: Statistics, Debug flow, Questions / Labs, Hints & Answers (which is selected), Feedback, and Information. A colorful cube icon is on the far right. Below the tabs, a message says: 'Select item from drop down, then press button to retrieve question/lab, hint, or answer.' To the left, a 'Filter' button is visible. A dropdown menu is open, containing a checked item 'select item' and a list of items: Lab L01, Lab L02, Lab L03, Lab L04, Lab L05, Lab L06, Lab L07, Lab L08, Lab Tools, Question Q01, Question Q02, Question Q03, Question Q04, Question Q05, Question Q06, and Question Q07. 'Question Q01' is highlighted with a blue selection bar. To the right of the dropdown are four buttons: 'Question/Lab' (blue), 'Hint' (green), and 'Answer' (yellow). Red arrows labeled 'Step 2', 'Step 3', and 'Step 4' point upwards from these buttons towards the respective text labels above them. The text 'Step 1: Select Question' is on the left, with a red arrow pointing downwards towards the dropdown menu.

Step 1: Select Question

Step 2

Step 3

Step 4

Collector - black

Statistics Debug flow Questions / Labs, Hints & Answers Feedback Information

Select item from drop down, then press button to retrieve question/lab, hint, or answer.

✓ select item

Lab L01
Lab L02
Lab L03
Lab L04
Lab L05
Lab L06
Lab L07
Lab L08
Lab Tools

Question Q01
Question Q02
Question Q03
Question Q04
Question Q05
Question Q06
Question Q07

Question/Lab Hint Answer

Working to complete the Question

IMPORTANT

Press the button to mark the question as completed

The screenshot shows the 'Collector - black' interface with the following components:

- Header:** Statistics, Debug flow, Questions / Labs, Hints & Answers, Feedback, Information.
- Toolbar:** Filter, Question Q01 dropdown, Question/Lab (highlighted in blue), Hint (green), Answer (yellow).
- Question Section:** Answer Q01 (orange background). Contains a gray box with the text "Answer hidden for demo purposes". Below it is a green button labeled "Press to mark completed".
- Hint Section:** Hint Q01 (light green background). Contains the text: "Really, you need a hint this early. Ensure the value 'nodes' is used as a parameter."
- Question Section:** Question Q01 (light blue background). Contains the text: "What are the node names in the cluster?"

Red arrows point from the text "Press the button to mark the question as completed" to the "Press to mark completed" button, and from the "Question/Lab", "Hint", and "Answer" buttons in the toolbar to their respective colored sections.

Authenticate session using cloudctl

<Open terminal or shell window>

cloudctl login --skip-ssl-validation

- API endpoint> https://169.62.194.213:8443

- Username> admin

- Password> (secret)

- Select a namespace:
(namespaces will be shown with number, select your team)
- Enter a number:> <enter the number for your team>

*Teams working
together to answer
the Questions*

Lecture

Containers

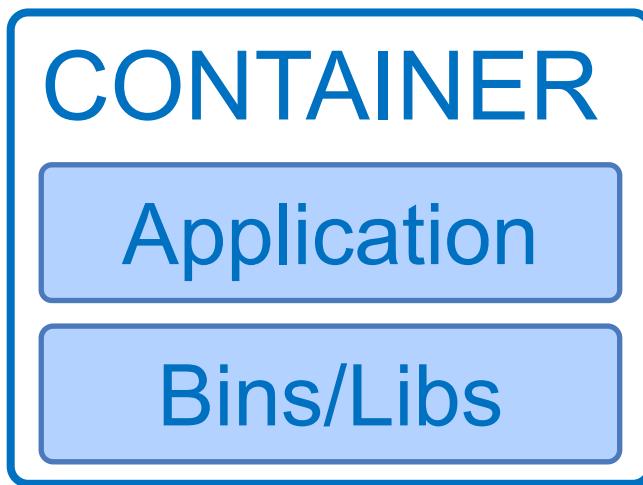
&

Apps



Components of a container based application

Docker



- Build
- Push
- Run
- Stop
- Inspect
- History
- Events

Defining K8 objects

Indentation
(spaces)

Hyphens

matter

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: avail-all
  namespace: avail
  labels:
    app: avail-all
spec:
  selector:
    matchLabels:
      app: avail-all
  replicas: 1
  template:
    metadata:
      labels:
        app: avail-all
    spec:
      containers:
        - name: avail-all
          image: ibmipccoc/avail:latest
          imagePullPolicy: Always
          command: ["/bin/bash", "-c", "/app/avail.sh"]
          env:
            - name: APP_NAMESPACE
              valueFrom:
                fieldRef:
                  fieldPath: metadata.namespace
            - name: APP_NAME
              valueFrom:
                fieldRef:
                  fieldPath: metadata.name
            - name: COLLECTOR_CONFIG
              valueFrom:
                configMapKeyRef:
                  name: avail-collector-config
                  key: COLLECTOR_CONFIG
            - name: INSTRUCTOR_CONFIG
              valueFrom:
                configMapKeyRef:
                  name: avail-collector-config
                  key: INSTRUCTOR_CONFIG
  resources:
    requests:
      cpu: 100m
      memory: 100Mi
```

yaml



Quotes

Commas

matter

```
{
  "kind": "Deployment",
  "metadata": {
    "name": "avail-all",
    "namespace": "avail",
    "labels": {
      "app": "avail-all"
    }
  },
  "spec": {
    "selector": {
      "matchLabels": {
        "app": "avail-all"
      }
    },
    "replicas": 1,
    "template": {
      "metadata": {
        "labels": {
          "app": "avail-all"
        }
      },
      "spec": {
        "containers": [
          {
            "name": "avail-all",
            "image": "ibmipccoc/avail:latest",
            "imagePullPolicy": "Always",
            "command": [
              "/bin/bash",
              "-c",
              "/app/avail.sh"
            ],
            "env": [
              {
                "name": "APP_NAMESPACE",
                "valueFrom": {
                  "fieldRef": {
                    "fieldPath": "metadata.namespace"
                  }
                }
              },
              {
                "name": "APP_NAME",
                "valueFrom": {
                  "fieldRef": {
                    "fieldPath": "metadata.name"
                  }
                }
              }
            ]
          }
        ]
      }
    }
  }
}
```

json

What's running in the container

k8

```
apiVersion: apps/v1
kind: Deployment
metadata:
  name: avail-all
  namespace: avail
  labels:
    app: avail-all
spec:
  selector:
    matchLabels:
      app: avail-all
  replicas: 1
  template:
    metadata:
      labels:
        app: avail-all
    spec:
      containers:
        - name: avail-all
          image: ibmcpoc/avail:latest
          imagePullPolicy: Always
          command: ["/bin/bash", "-c", "/app/avail.sh"]
```



docker

```
FROM alpine
MAINTAINER IBM ICP CoC Team

CMD mkdir /app
WORKDIR /app
COPY avail.sh .

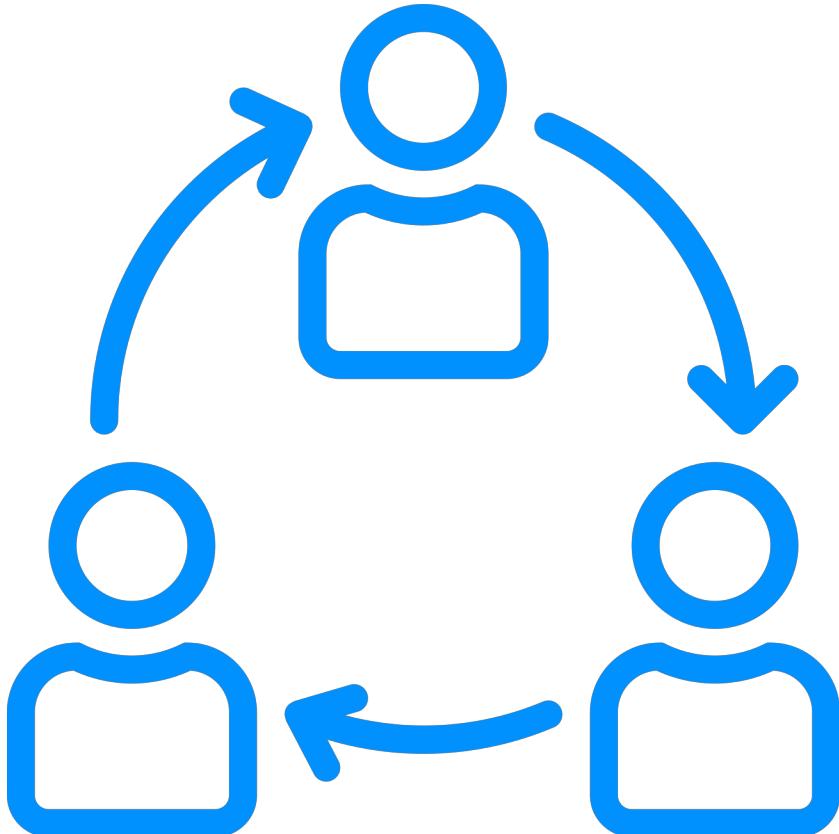
RUN apk add curl bash nano \
&& chmod +x avail.sh

CMD ["/bin/bash", "-c", "./avail.sh"]
```



Lab

*Fixing
stuff that's
broken*

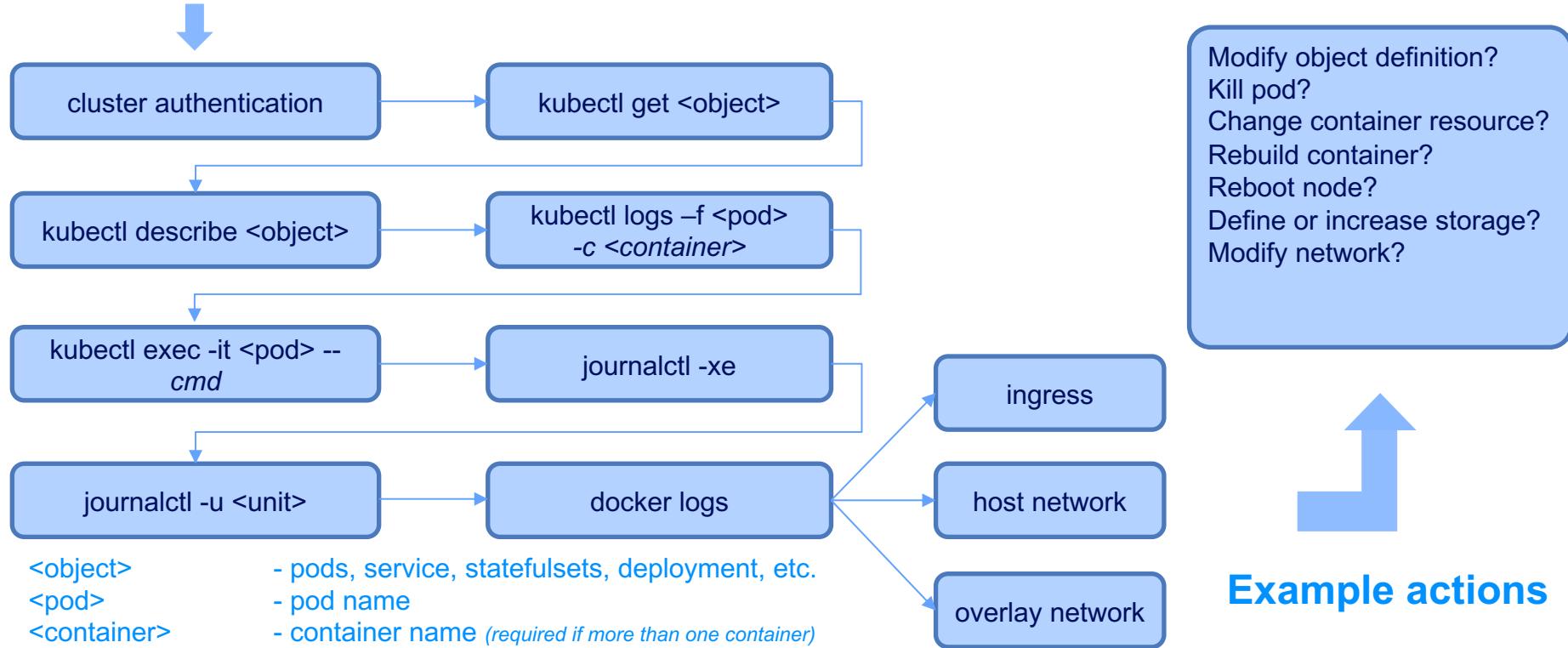


Accessing the Labs

The screenshot shows the 'Collector - black' interface with the following components:

- Header:** Statistics, Debug flow, Questions / Labs, Hints & Answers (highlighted), Feedback, Information.
- Sub-Header:** Select item from drop down, then press button to retrieve question/lab, hint, or answer.
- Filter:** A button labeled 'Filter' with a red arrow pointing to it from the text 'Step 1: Select Lab'.
- Dropdown:** A dropdown menu titled 'select item' containing the following options:
 - ✓ select item
 - Lab L01
 - Lab L02
 - Lab L03
 - Lab L04
 - Lab L05
 - Lab L06
 - Lab L07
 - Lab L08
 - Lab Tools
- Buttons:** Question/Lab (blue), Hint (green), Answer (yellow).
- Arrows:** Red arrows labeled 'Step 2', 'Step 3', and 'Step 4' point upwards from the bottom of each button towards the dropdown menu.

Example debug process



Don't forget to check

- Security
- Networking
- Storage
- Images
- CPU & Memory

*Teams working
together to complete
the Labs*

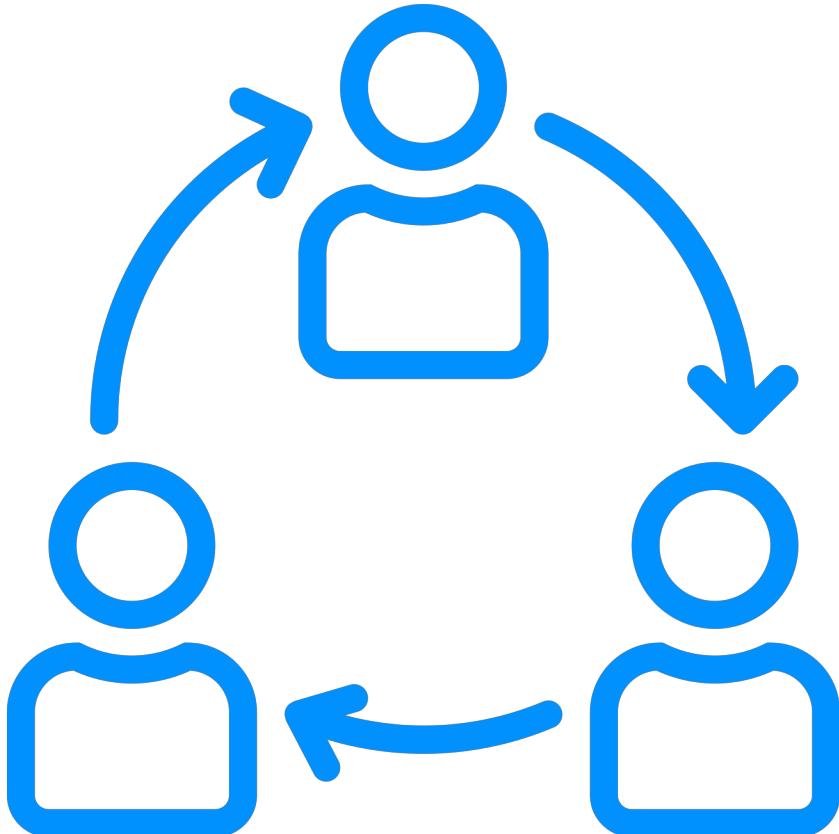
Lecture

ICP



Lab – Instructor Lead

*Trouble-
shoot
ICP*



What's in ICP?

- audit*
- auth*
- calico*
- k8*
- key-management*
- logging*
- metering*
- monitoring*

Not a complete list

What's in ICP?

- audit*
- auth*
- calico*
- k8*
- key-management*
- logging*
- metering*
- monitoring*

Not a complete list

*Teams working
together to complete
the ICP Labs*

Support

Slack #private-cloud

Intended for quick answers through swarming,
especially How To, Known Issues, best practices etc.

Cases can be opened at
<https://ibm.biz/icpsupport>

If you can't open a case, please see <https://ibm.biz/BdYuiZ>



Additional Information

Example of logs to collect

https://github.ibm.com/IBMPublicCloud/support-tools/blob/master/log_collector/icplogcollector-master.sh

VpK and KubeToy

<https://github.com/IBM-ICP-CoC/VpK>

<https://github.com/IBM-ICP-CoC/KubeToy>

50 Useful Kubernetes Tools

<https://caylent.com/50-useful-kubernetes-tools/>

Get Session Credit

1. Open up the Fast Start event app
2. Find this session in your schedule

Session Name: Problem Determination and Trouble Shooting

Session ID: 7440

3. Click on 'check in'
4. Enter the code

7440

5. Don't forget the session survey!



Thank you

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Social Tips & Tricks Videos (pinned in #dte-social Slack channel)

<https://bit.ly/linked-profile>

<https://bit.ly/linked-headline>

<http://bit.ly/link-communities>

Community Videos (pinned in #IBMCommunity Slack channel)

<http://ibm.biz/community-intro>

<http://ibm.biz/community-groups>

<http://ibm.biz/community-notification>

Meetup Information (starter kit & training)

<http://ibm.biz/meetup-kit>

<http://ibm.biz/meetup-training>

Recorded Lunch and Learn

<http://bit.ly/social-lnl>

DTE Social Handles (on ZACs)

<http://ibm.biz/dte-social>

IBM Cloud Social Handles

<http://ibm.biz/cloud-social>

DTE Blog Calendar

<http://ibm.biz/blog-calendar>

Social Selling Badges

<https://ibm.co/2yGFm00>



