



OpenShift Observability Stack

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Outline

What is Observability?

OpenShift Container Platform monitoring

OpenShift Logging

OpenShift Distributed Tracing

OpenTelemetry





What is Observability?

What? ability to measure a system's internal state based on (telemetry) data

Why? reduce mean time to detect (MTTD) and mean time to remediate (MTTR), optimize performance

How? instrumenting applications with telemetry data



Observability Signals

- Metrics
- Logs
- Traces
- Profiles



Observability on OpenShift













OpenShift Container Platform monitoring

Dashboards Time Range **Refresh Interval** Last 30 minutes 🔹 30 seconds 🔹 Dashboard Cluster etcd 💌 etcd 🔻 Up **RPC** Rate **Active Streams** Inspect Inspect Inspect 40 160 140 30 120 100 27. Sep. 2023, 12:51:02 20 RPC Rate 37,96 80 RPC Failed Rate 0 60 10 40 20 0 12:25 12:30 12:35 12:40 12:45 12:50 12:25 12:30 12:35 12:40 12:45 12:50 DB Size **Disk Sync Duration** Inspect Inspect Memory Inspect 95,37 MiB 40 ms 476,8 MiB 76,29 MiB 381,5 MiB 30 ms 57,22 MiB 286,1 MiB 20 ms 38,15 MiB 190,7 MiB 10 ms 19,07 MiB 95,37 MiB

OpenShift Container Platform monitoring

Instrumentation	Prometheus Client libraries
Collection and Storage	Prometheus (Cluster Monitoring Operator / Prometheus Operator)
Visualization	OpenShift Console

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OCP Monitoring: Latest Updates & Roadmap

- <u>Configure node-exporter collectors</u> (4.13)
- Metrics collection profiles (4.13, Technology Preview)
- Optional built-in monitoring (planning)

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- UTF-8 support for metric and label names (<u>upstream proposal</u>)
- Native OTLP support: receiving (upstream, 2.47.0) and exporting (<u>discussion</u>)



OpenShift Logging

🎕 Administrator	~	Logs				🔟 Show Histogram	Last1hour 🔻	Refresh off 🔹 🕄 🕄
Home	>	▼ Content ▼ Q Search by C	Content Severity -	infrastructure 💌	Show Resources Run Query			Show Query
Operators	>	Date 👃	Message					
Workloads	>	> 27. Sep. 2023, 21:32:35.746	I0927 19:21:26.085810 1	task_graph.go:477	Running 16 on worker 0			
Networking	>	> 27. Sep. 2023, 21:32:34.734	I0927 19:21:04.047816 1	cvo.go:614] Starte	ed syncing cluster version "openshift-clus	<pre>ster-version/version", spec char</pre>	nges, status, an	ıd payload
		> 27. Sep. 2023, 21:32:34.734	10927 19:20:49.047940 1	cvo.go:616] Finis	ned syncing cluster version "openshift-clu	ister-version/version" (462.26µ	s)	
Storage	>	> 27. Sep. 2023, 21:32:34.734	> 27. Sep. 2023, 21:32:34.734 [0927 19:20:49.047883 1 status.go:90] merge into existing history completed=true desired=v1.Release{Version:"4.13.9", Image:"quay.io/crcont/ocp-relea se@sha256:b89e4a580f6574bcae3591ba29da99810f6bd31f29da778e402cc83c8e60d5bb", URL:"https://access.redhat.com/errata/RHSA-2023:4603", Channels:[]string					
Builds	>		<pre>(nil)} last=&v1.UpdateH 3, time.August, 24, 3, a778e402cc83c8e60d5bb",</pre>	istory{State:"Comp 19, 45, 0, time.Loo Verified:false, A	leted", StartedTime:time.Date(2023, time.A cal), Version:"4.13.9", Image:"quay.io/crc cceptedRisks:""}	<pre>sugust, 24, 2, 53, 50, 0, time.l cont/ocp-release@sha256:b89e4a5/</pre>	Local), Completi 80f6574bcae3591b	.onTime:time.Date(202)a29da99810f6bd31f29d
Observe Alerting	~	27. Sep. 2023, 21:32:34.734	I0927 19:20:49.047804 1 Done:785, Total:900, Com me.September, 27, 19, 13	status.go:170] Syn mpleted:61, Reconc: 8, 26, 247646526,	nchronizing status errs=field.ErrorList(ni iling:true, Initial:false, VersionHash:"vC time.Local), Actual:v1.Release{Version:"4.	.1) status=&cvo.SyncWorkerStatus :6jwb5wHrI=", Architecture:"amd/ .13.9", Image:"quay.io/crcont/o	s{Generation:5, 64", LastProgres cp-release@sha25	Failure:error(nil), ss:time.Date(2023, ti 56:b89e4a580f6574bcae
Metrics			3591ba29da99810f6bd31f2 PayloadStatus:cvo.LoadPa	9da778e402cc83c8e60 ayloadStatus{Step:	0d5bb", URL:"https://access.redhat.com/eri 'PayloadLoaded", Message:"Payload loaded v	:ata/RHSA-2023:4603", Channels: /ersion=\"4.13.9\" image=\"quay	[]string(nil)}, .io/crcont/ocp-r	Verified:false, load release@sha256:b89e4a
Dashboards			580f6574bcae3591ba29da9 ture:"", Version:"4.13.	9810f6bd31f29da778 9", Image:"quay.io.	e402cc83c8e60d5bb\" architecture=\"amd64\" /crcont/ocp-release@sha256:b89e4a580f6574b	'", AcceptedRisks:"", Failure:e: ccae3591ba29da99810f6bd31f29da7	rror(nil), Updat 78e402cc83c8e60d	:e:v1.Update{Architec d5bb", Force:false},
Targets			Verified:false, Local:t:	rue, LastTransition	Time:time.Time{wall:0xc13d312042cb75aa, e	ext:330544826947, loc:(*time.Log	cation)(0x2feeb2	<pre>20)}}, CapabilitiesSt</pre>
Logs			nshift-samples"}, Known place", "openshift-samp	Capabilities:[]v1.(les"}}, Implicitly	ClusterVersionCapabilitiesStatus{EnabledCapabil ClusterVersionCapability{"CSISnapshot", "C EnabledCaps:[]v1.ClusterVersionCapability(<pre>intres:[]v1.clusterversioncapablic ionsole", "Insights", "NodeTunin (nil)}}</pre>	ng", "Storage",	"baremetal", "market
Compute	>	_timestamp 2023-09-27T19:20:49.04783	5768Z		file /var/log/pods/openshift-clu de3477cfa296/cluster-versi	ister-version_cluster-version-operator-7cl on-operator/5.log	b69b697b-wrkjr_a77	'ffbbe-b972-42b6-8e52-
User Management	>	hostname crc-mmwz7-master-0			kubernetes_annotations_open he shift_io_scc	ostaccess		
Administration	``	kubernetes container id cri-o://a78b2766	ic3156338ede769f9456c57f4a1e7	97c59829c29585cc6d7	a675b1119 kubernetes container image gua	av.io/crcont/ocp-		



OpenShift Logging

	Legacy	Recommendation
Instrumentation	stdout	stdout
Collection	Fluentd (OpenShift Logging Operator)	Vector (OpenShift Logging Operator)
Storage	ElasticSearch (ElasticSearch Operator) <i>block storage</i>	Grafana Loki (Loki Operator) object storage
Visualization	Kibana (OpenShift Logging Operator)	OpenShift Console



OpenShift Logging: Latest Updates

- <u>Elasticsearch Operator deprecated</u> (5.4)
- Fluentd deprecated (5.6)
- Detect multi-line exceptions (5.7)
- Log based alerting (5.7)

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OpenShift Distributed Tracing

JAEGER UI Search Compare System Architecture	Monitor						Q. Lookup by Trace ID	About Jaeger ∨
← v frontend: HTTP GET /dispatch 2816d	се				F	Find		光 Trace Timeline ∨
Trace Start September 27 2023, 13:03:43.282 Duration 735.41ms Ser	vices 6 Depth 5 To	tal Spans 50						
Oµs	183.85ms			367.71ms		551.56ms		735.41ms
							-	
Service & Operation \lor > \Leftrightarrow »	0µs		183.85ms		367.71ms		551.56ms	735.41ms
✓ frontend HTTP GET /dispatch								
✓ frontend HTTP GET: /customer	C				375.19ms			
✓ frontend HTTP GET					375.17ms			
Customer HTTP GET /customer					374.86ms			
Mysql SQL SELECT	6				374.74ms			
	SQL SELECT	Г					Service: mysql Duration: 374.	74ms Start Time: 424µs
	∨ Tags							
	otel.library.name	<pre>go.opentelemetry.io/otel/s</pre>	dk/tracer					
	peer.service	mysql						Ū
	request	6157-10						
	span.kind	internal						
	sql.query	SELECT * FROM customer WHE	RE customer_id=5	67				
	> Process:							
	> Logs (2)							
							S	oanID: a5060f1f3385b7e2 🔗
rontend /driver.DriverService/FindNearest				175.	5.49ms			
✓ driver /driver.DriverService/FindNearest				175.	5.18ms			
redis FindDriverIDs				19.	9.05ms (1998)			
redis GetDriver					12.38ms 🛑			
redis GetDriver					10.13ms 🛑			
• redis GetDriver					29.67ms			



OpenShift Distributed Tracing

	Legacy	Recommendation
Instrumentation	OpenTracing/Jaeger or Zipkin	OpenTelemetry, Jaeger, OpenCensus or Zipkin
Collection		OpenTelemetry Collector (OpenShift distributed tracing data collection operator)
Storage	Jaeger (OpenShift distributed tracing platform operator) ElasticSearch (ElasticSearch Operator) <i>block storage</i>	Grafana Tempo (Tempo Operator) o <i>bject storage</i>
Visualization	Jaeger UI (OpenShift distributed tracing platform operator)	Jaeger UI (Tempo Operator) OpenShift Console (planned)



OpenShift Distributed Tracing: Tempo Operator

- Resource Limits
- AuthN and AuthZ
- Managed upgrades
- Multitenancy
- mTLS
- Jaeger UI
- Observability



OpenShift Distributed Tracing: Roadmap

- Distributed Tracing 3.0 (GA) (in development)
- <u>Service Performance Monitoring</u> (3.0)
- Tracing integration in OpenShift Console (in development)
- ARM support (in development)
- Support Tempo monolith deployment (planning)



OpenTelemetry

- SDK, Data Model, <u>semantic conventions</u> ("k8s.pod.name")
- Protocol (OTLP)
- Collector (receive, process and export telemetry data)



OpenShift distributed tracing data collection

Receivers	Exporters	Processors	Extensions	Connectors
OTLP	OTLP	Batch	zPages	Span Metrics
Jaeger	Logging	Memory Limiter	Ballast	
OpenCensus	Prometheus	Attribute	Jaeger Remote Sampling	
Zipkin	Kafka*	Resource	Health Check	
Prometheus*		Span	pprof	
Hostmetrics*		k8s Attributes	OAuth2 Client Auth	
Kafka*		Resource Detection	Bearer Token Auth	
		Filter		
		Routing		



OpenTelemetry: Roadmap

- Enable Prometheus and Host Metrics receiver (3.0)
- Enable Kafka Receiver and Exporter (3.0)
- ARM support (in development)
- Distributed collector configuration (planning)
- Support exporting all telemetry data from OpenShift (planning)



Q&A







Thank you

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