

Problems of a microservice

who can I talk to

where are my collaborators

how can I contact others

how can others contact me

where do I take my properties from

what's my API

how to be part of a bigger system: logs

how do I expose my metrics

how do I view my metrics



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Who can I talk to?

you just have to:

create a microservice metadata file (i.e. microservice.json)



```
src/main/resources/microservice.json

{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```


Microservice metadata file

src/main/resources/microservice.json

```
{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```


Microservice metadata file

Microservice context (realm)

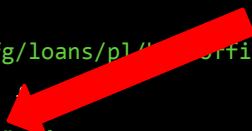


```
{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```

Microservice metadata file

```
{
  "pl": {
    "this": "com/ofg/loans/pl/bluecash-service-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```

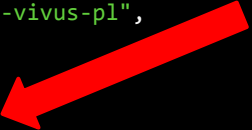
name of services I talk to



Microservice metadata file

```
{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```

path to service I talk to
in context (realm)



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Where are my collaborators?

```
{  
  "pl": {  
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",  
    "dependencies": {  
      "bluecash-pl": {  
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"  
      }  
    }  
  }  
}
```

COLLABORATOR'S PATH IN ZOOKEEPER

pl/com/ofg/payments/pl/bluecash/bluecash-vivus-pl

Where are my collaborators?

PL

`pl/com/ofg/loans/payment-processor`

`pl/com/ofg/loans/risk-analyzer`

LT

`lt/com/ofg/loans/payment-processor`

`lt/com/ofg/loans/risk-analyzer`

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How can I contact others?

if you want to call your collaborator (e.g. *'bluecash-pl'*) just:

use 4Finance **ServiceRestClient** bean



How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
        .contentTypeJson()  
    .andExecuteFor()  
        .anObject()  
        .ofType(String)
```

COLLABORATOR'S ALIAS
FROM *MICROSERVICE*.
JSON

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')
```

```
.post()
```

HTTP METHOD

```
.onUrl('/api/whatever/123')
```

```
.body('{"some":"json"}')
```

```
.withHeaders()
```

```
.contentTypeJson()
```

```
.andExecuteFor()
```

```
.anObject()
```

```
.ofType(String)
```

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
        .contentTypeJson()  
    .andExecuteFor()  
        .anObject()  
        .ofType(String)
```



URL ON COLLABORATOR
TO CALL

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
        .contentTypeJson()  
    .andExecuteFor()  
        .anObject()  
        .ofType(String)
```

BODY TO SEND

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
        .contentTypeJson()  
    .andExecuteFor()  
        .anObject()  
        .ofType(String)
```



HEADERS TO SEND

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
    .contentTypeJson()  
    .andExecuteFor()  
    .anObject()  
    .ofType(String)
```



RETURN A RESPONSE OF A
GIVEN TYPE

How can I contact others?

```
serviceRestClient.forService('bluecash-pl')  
    .post()  
    .onUrl('/api/whatever/123')  
    .body('{"some":"json"}')  
    .withHeaders()  
        .contentTypeJson()  
    .andExecuteFor()  
        .anObject()  
        .ofType(String)
```



Problems of a microservice

who can I talk to

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How can others contact me?

```
{  
  "pl": {  
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",  
    "dependencies": {  
      "bluecash-pl": {  
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"  
      }  
    }  
  }  
}
```

How can others contact me?


Microservice context (realm)



```
{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```

How can others contact me?

my path in context (realm)



```
{
  "pl": {
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",
    "dependencies": {
      "bluecash-pl": {
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"
      }
    }
  }
}
```

How can others contact me?

```
{  
  "pl": {  
    "this": "com/ofg/loans/pl/backoffice-vivus-pl",  
    "dependencies": {  
      "bluecash-pl": {  
        "path": "com/ofg/payments/pl/bluecash/bluecash-vivus-pl"  
      }  
    }  
  }  
}
```

MY PATH

pl/com/ofg/loans/pl/backoffice-vivus-pl

How can others contact me?

when microservice boots up it registers itself in Zookeeper under specified path

you can register multiple instances under same path

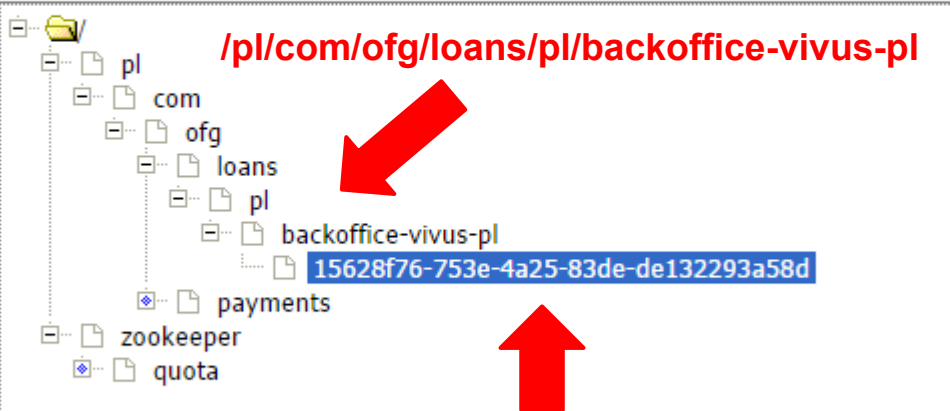
Zookeeper supports load balancing
(Round Robin, Random and Sticky)



How can others contact me?

Exhibitor for ZooKeeper

Control Panel Explorer Config Log



/pl/com/ofg/loans/pl/backoffice-vivus-pl

15628f76-753e-4a25-83de-de132293a58d

instance id (you can have multiple ones)

How can others contact me?

Instance entry in Zookeeper:

Data as String:

```
{  
  "name": "com/ofg/loans/pl/backoffice-vivus-pl",  
  "id": "15628f76-753e-4a25-83de-de132293a58d",  
  "address": "192.168.0.1",  
  "port": 8080,  
  "sslPort": null,  
  "payload": null,  
  "registrationTimeUTC": 1410343209917,  
  "serviceType": "DYNAMIC",  
  "uriSpec": { ... }  
}
```


How can others contact me?

Instance entry in Zookeeper:

Data as String:

```
{  
  "name": "com/ofq/loans/pl/backoffice-vivus-pl",  
  "id": "15628f76-753e-4a25-83de-de132293a58d",  
  "address": "192.168.0.1",  
  "port": 8080,  
  "sslPort": null,  
  "payload": null,  
  "registrationTimeUTC": 1410343209917,  
  "serviceType": "DYNAMIC",  
  "uriSpec": { ... }  
}
```

THE PATH
WHERE
MICROSERVICE
REGISTERS
ITSELF IN GIVEN
REALM



How can others contact me?

Instance entry in Zookeeper:

Data as String:

```
{  
  "name": "com/ofg/loans/pl/backoffice-vivus-pl",  
  "id": "15628f76-753e-4a25-83de-de132293a58d",  
  "address": "192.168.0.1",  
  "port": 8080,  
  "sslPort": null,  
  "payload": null,  
  "registrationTimeUTC": 1410343209917,  
  "serviceType": "DYNAMIC",  
  "uriSpec": { ... }  
}
```

MICROSERVICE
REGISTERS
ITSELF IN
ZOOKEEPER
WITH ADDRESS
AND PORT

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what's my API

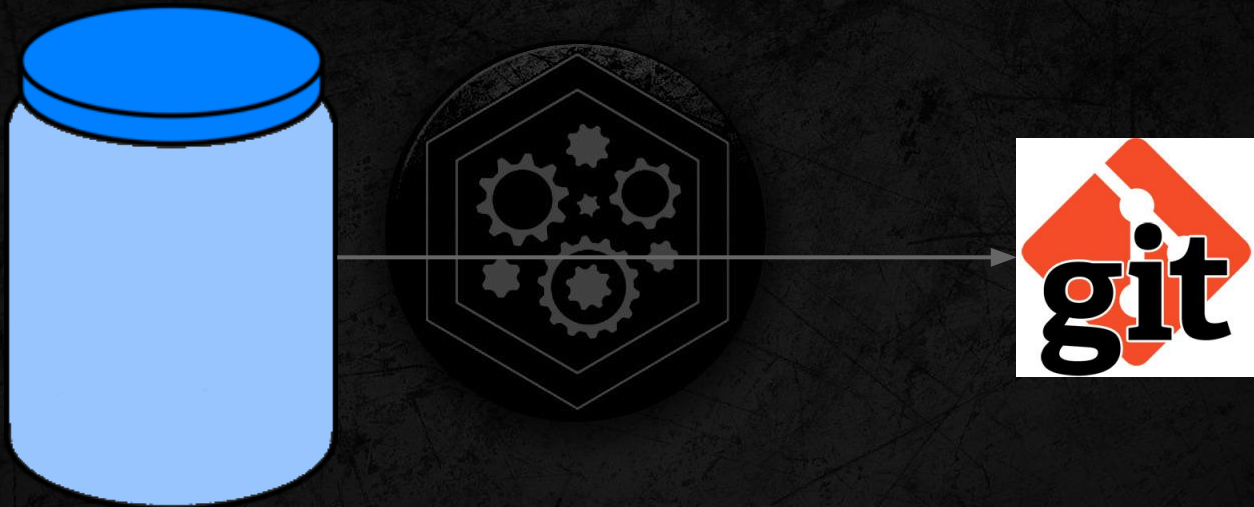
how to be part of a bigger system: logs

how do I expose my metrics

how do I view my metrics



Where do I take my props from?



Where do I take my props from?

the application properties are taken from GIT repository

the **APP_ENV** environment variable defines the name of the server

the **CONFIG_FOLDER** is the path to properties

to encrypt properties **ENCRYPT_KEY** var is needed to define a secret value



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What's my API?

 **swagger**  Explore

Spring Boot Microservice API

APIs for Spring Boot Microservice template

[Terms of service](#)
[Contact the developer](#)
[My Apps API Licence Type](#)

apply-controller : Apply Controller

Show/Hide | List Operations | Expand Operations | Raw

POST	/client/{personalId}/application/{applicationId}	applyForLoan
------	--	--------------

bank-controller : Bank Controller

Show/Hide | List Operations | Expand Operations | Raw

GET	/bank/{bankAccountNumber}	getBankName
-----	---------------------------	-------------

basic-error-controller : Basic Error Controller

Show/Hide | List Operations | Expand Operations | Raw

cancel-loan-application-controller : Cancel Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

PUT	/client/{personalId}/application/{applicationId}/cancel	cancelLoanApplication
-----	---	-----------------------



confirm-loan-application-controller : Confirm Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

POST	/client/{personalId}/application/{applicationId}/confirm	confirmLoanApplication
PUT	/client/{personalId}/application/{applicationId}/confirm	confirmLoanApplicationPut

What's my API?

REST
CONTROLLERS

 **swagger**  Explore

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apply-controller : Apply Controller

Show/Hide | List Operations | Expand Operations | Raw

POST

/client/{personalId}/application/{applicationId}

applyForLoan

bank-controller : Bank Controller

Show/Hide | List Operations | Expand Operations | Raw

GET

/bank/{bankAccountNumber}

getBankName

basic-error-controller : Basic Error Controller

Show/Hide | List Operations | Expand Operations | Raw

cancel-loan-application-controller : Cancel Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

PUT

/client/{personalId}/application/{applicationId}/cancel

cancelLoanApplication

confirm-loan-application-controller : Confirm Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

POST

/client/{personalId}/application/{applicationId}/confirm

confirmLoanApplication



PUT

/client/{personalId}/application/{applicationId}/confirm

confirmLoanApplicationPut

What's my API?

METHOD TYPES

swagger   http://[redacted]/api-docs api_key [Explore](#)

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PUT	/client/{personalId}/application/{applicationId}/cancel	cancelLoanApplication
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POST	/client/{personalId}/application/{applicationId}/confirm	confirmLoanApplication
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What's my API?

swagger   http://[redacted]/api-docs api_key [Explore](#)

Spring Boot Microservice API

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apply-controller : Apply Controller

Show/Hide | List Operations | Expand Operations | Raw

POST	<u>/client/{personalId}/application/{applicationId}</u>	<u>applyForLoan</u>
------	---	---------------------

bank-controller : Bank Controller

Show/Hide | List Operations | Expand Operations | Raw

GET	<u>/bank/{bankAccountNumber}</u>	<u>getBankName</u>
-----	----------------------------------	--------------------

basic-error-controller : Basic Error Controller

Show/Hide | List Operations | Expand Operations | Raw

cancel-loan-application-controller : Cancel Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

PUT	<u>/client/{personalId}/application/{applicationId}/cancel</u>	<u>cancelLoanApplication</u>
-----	--	------------------------------

confirm-loan-application-controller : Confirm Loan Application Controller

Show/Hide | List Operations | Expand Operations | Raw

POST	/client/{personalId}/application/{applicationId}/confirm	confirmLoanApplication
PUT	/client/{personalId}/application/{applicationId}/confirm	confirmLoanApplicationPut

METHOD URLS

METHOD NAMES

What's my API? - Try me out!

bank-controller : Bank Controller

Show/Hide | List Operations | Expand Operations | Raw

GET

/bank/{bankAccountNumber}

getBankName

Implementation Notes

getBankName

Response Class

Model | Model Schema

```
{
  "name": ""
}
```

Response Content Type

application/xml

Parameters

Parameter	Value	Description	Parameter Type	Data Type
bankAccountNumber	<input type="text" value="{required}"/>	bankAccountNumber	path	string

Response Messages

HTTP Status Code	Reason	Response Model
200	OK	Model Model Schema <div><pre>{ "name": "" }</pre></div>
403	Forbidden	
401	Unauthorized	
404	Not Found	

Try it out!

What's my API? - Try me out!

bank-controller : Bank Controller [Show/Hide](#) [List Operations](#) [Expand Operations](#) [Raw](#)

GET `/bank/{bankAccountNumber}` [getBankName](#)

[Implementation Notes](#)
getBankName

[Response Class](#)
Model | [Model Schema](#)

```
{
  "name": ""
}
```

Response Content Type:

[Parameters](#)

Parameter	Value	Description	Parameter Type	Data Type
bankAccountNumber	<input type="text" value="{required}"/>	bankAccountNumber	path	string

[Response Messages](#)

HTTP Status Code	Reason	Response Model
200	OK	Model Model Schema
403	Forbidden	
401	Unauthorized	
404	Not Found	

[Try it out!](#)

ENTER
PARAMETERS

SEND A
REQUEST

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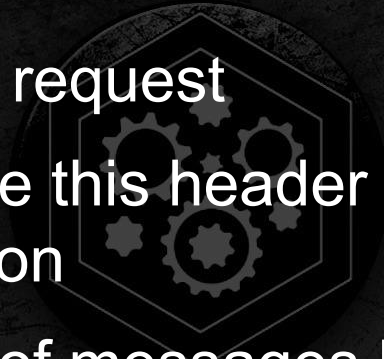
How to be part of a bigger system: logs?

correlation ID:

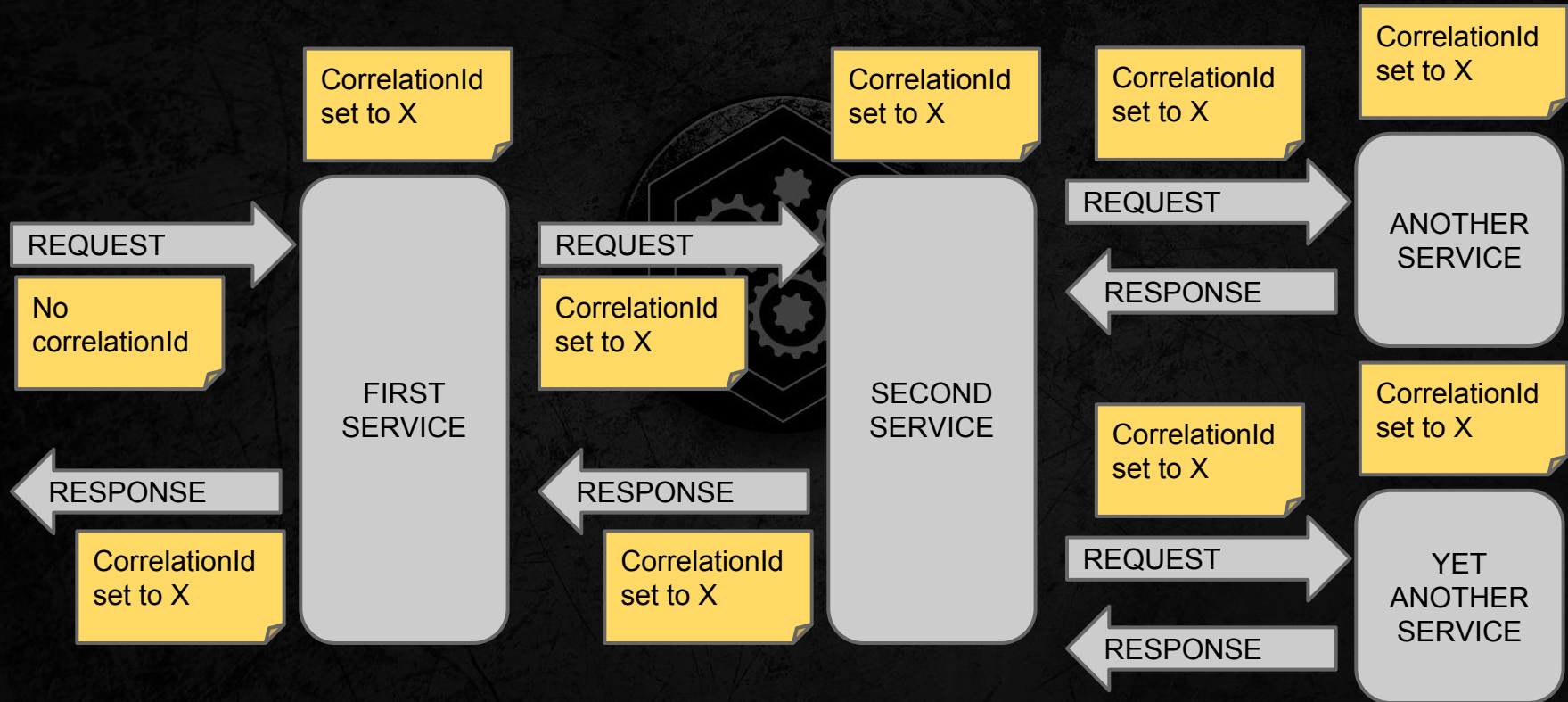
a header value in a request

in each microservice this header is the same for the same business action

you can see a flow of messages between microservices in a chronological order



How to be part of a bigger system: logs?



How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

qtp326276239-140 |

c.o.c.v.w.a.AbstractBackofficeApplication |

Initializing new backoffice application



How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

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TIMESTAMP IN ISO8601
FORMAT

How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

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LOGGING LEVEL

How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

qtp326276239-140 |

c.o.c.v.w.a.AbstractBackofficeApplication |

Initializing new backoffice application



CORRELATION ID

How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

qtp326276239-140 |

c.o.c.v.w.a.AbstractBackofficeApplication |

Initializing new backoffice application



THREAD NAME

How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

qtp326276239-140 |

c.o.c.v.w.a.AbstractBackofficeApplication |

Initializing new backoffice application



CLASS FULLY QUALIFIED NAME
(SHORTENED)

How to be part of a bigger system: logs?

Log example:

2014-09-10 14:34:40.448+0200 |

INFO |

538898f2-543f-48a3-ad9e-3d2961b2b73d |

qtp326276239-140 |

c.o.c.v.w.a.AbstractBackofficeApplication |

Initializing new backoffice application



LOG MESSAGE

How to be part of a bigger system: logs?

@timestamp ^>	< correlationId >	< shortmessage >	< type
2014-09-11T09:18:20.361Z	e88c933d-5c85-4911-a86b-ea1039b50959	Generating new correlationId: e88c933d-5c85-4911-a86b-ea1039b50959	broker_pl
2014-09-11T09:18:21.474Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> GET	broker_pl
2014-09-11T09:18:21.483Z	e88c933d-5c85-4911-a86b-ea1039b50959	Get client - personal-id	backoffice_vivus_pl
2014-09-11T09:18:21.498Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== RESULT =====	broker_pl
2014-09-11T09:18:21.546Z	e88c933d-5c85-4911-a86b-ea1039b50959	<?xml version="1.0" encoding="UTF-8"?><client> <accept...	broker_pl
2014-09-11T09:18:21.576Z	e88c933d-5c85-4911-a86b-ea1039b50959	Apply request for client with personalId [REDACTED] <application>...	broker_pl
2014-09-11T09:18:21.577Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== ENTERING exchange =====	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> POST	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== url ==> [REDACTED]	broker_pl
2014-09-11T09:18:21.594Z	e88c933d-5c85-4911-a86b-ea1039b50959	>>> ApplyForLoanCommand([REDACTED] amount=300.00, appl...	backoffice_vivus_pl
2014-09-11T09:18:21.614Z	e88c933d-5c85-4911-a86b-ea1039b50959	Event LoanApplicationOpened[loanApplication-[REDACTED]]	backoffice_vivus_pl

How to be part of a bigger system: logs?

@timestamp ^>	< correlationId >	< shortmessage >	< type
2014-09-11T09:18:20.361Z	e88c933d-5c85-4911-a86b-ea1039b50959	Generating new correlationId: e88c933d-5c85-4911-a86b-ea1039b50959	broker_pl
2014-09-11T09:18:21.474Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> GET	broker_pl
2014-09-11T09:18:21.483Z	e88c933d-5c85-4911-a86b-ea1039b50959	Get client - personal-id	backoffice_vivus_pl
2014-09-11T09:18:21.498Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== RESULT =====	broker_pl
2014-09-11T09:18:21.546Z	e88c933d-5c85-4911-a86b-ea1039b50959	<?xml version="1.0" encoding="UTF-8"?><client> <accept...	broker_pl
2014-09-11T09:18:21.576Z	e88c933d-5c85-4911-a86b-ea1039b50959	Apply request for client with personalId [REDACTED] <application>...	broker_pl
2014-09-11T09:18:21.577Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== ENTERING exchange =====	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> POST	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== url ==> [REDACTED]	broker_pl
2014-09-11T09:18:21.594Z	e88c933d-5c85-4911-a86b-ea1039b50959	>>> ApplyForLoanCommand([REDACTED] amount=300.00, appl...	backoffice_vivus_pl
2014-09-11T09:18:21.614Z	e88c933d-5c85-4911-a86b-ea1039b50959	Event LoanApplicationOpened[loanApplication-[REDACTED]]	backoffice_vivus_pl



SAME CORRELATION ID

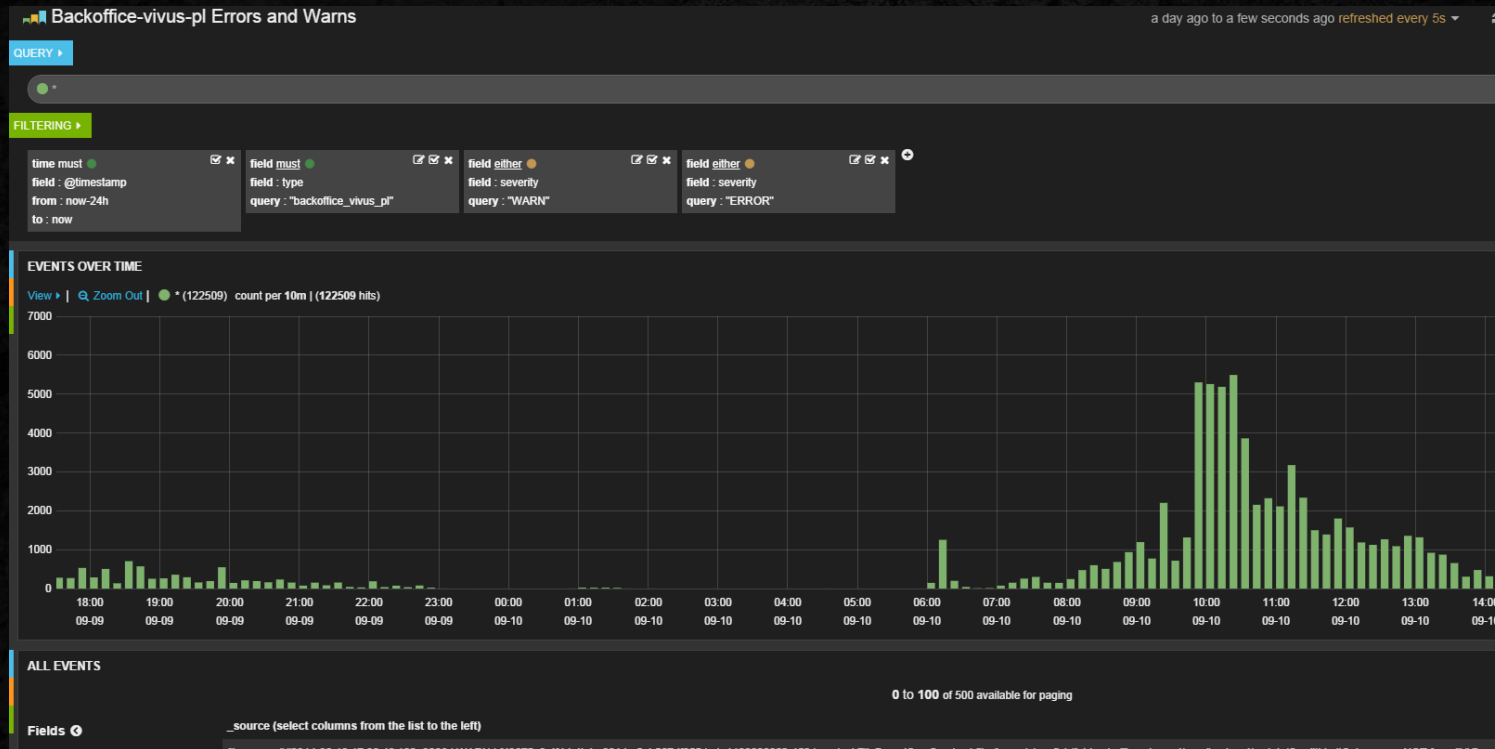
How to be part of a bigger system: logs?

@timestamp ^>	< correlationId >	< shortmessage >	< type
2014-09-11T09:18:20.361Z	e88c933d-5c85-4911-a86b-ea1039b50959	Generating new correlationId: e88c933d-5c85-4911-a86b-ea1039b50959	broker_pl
2014-09-11T09:18:21.474Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> GET	broker_pl
2014-09-11T09:18:21.483Z	e88c933d-5c85-4911-a86b-ea1039b50959	Get client - personal-id	backoffice_vivus_pl
2014-09-11T09:18:21.498Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== RESULT =====	broker_pl
2014-09-11T09:18:21.546Z	e88c933d-5c85-4911-a86b-ea1039b50959	<?xml version="1.0" encoding="UTF-8"?><client> <accept...	broker_pl
2014-09-11T09:18:21.576Z	e88c933d-5c85-4911-a86b-ea1039b50959	Apply request for client with personalId [REDACTED] <application>...	broker_pl
2014-09-11T09:18:21.577Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== ENTERING exchange =====	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== method ==> POST	broker_pl
2014-09-11T09:18:21.578Z	e88c933d-5c85-4911-a86b-ea1039b50959	===== url ==> [REDACTED]	broker_pl
2014-09-11T09:18:21.594Z	e88c933d-5c85-4911-a86b-ea1039b50959	>>> ApplyForLoanCommand([REDACTED] amount=300.00, appl...	backoffice_vivus_pl
2014-09-11T09:18:21.614Z	e88c933d-5c85-4911-a86b-ea1039b50959	Event LoanApplicationOpened[loanApplication-[REDACTED]]	backoffice_vivus_pl



DIFFERENT
MICROSERVICES

How to be part of a bigger system: logs?



Problems of a microservice

who can I talk to

where are my collaborators

how can I contact others

how can others contact me

where do I take my properties from

what's my API

how to be part of a bigger system: logs

how do I expose my metrics

how do I view my metrics



How do I expose my metrics?

you just have to update your metrics:

```
// treat this code more of a pseudocode ;)
Counter transferBalanceRequests = metricRegistry.counter('transfer.requests.balance')

void doSomethingUponTransferBalanceRequest() {

    // do sth with the request for transfer balance
    ...

    // and update the counter metric
    transferBalanceRequests.inc()
}
```

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How do I view my metrics?

you can view your metrics in Graphite

you can create dashboards in Grafana

your application metrics are exposed via JMX



How do I view my metrics?



How do I view my metrics?

