СЛЁРМ Образование для инженеров и технических лидеров

RabbitMQ - High Availability, High Load

Спикер: Алексей Барабанов

Цель урока

Узнать о HL/HA возможностях сервиса и уметь их настраивать на практике

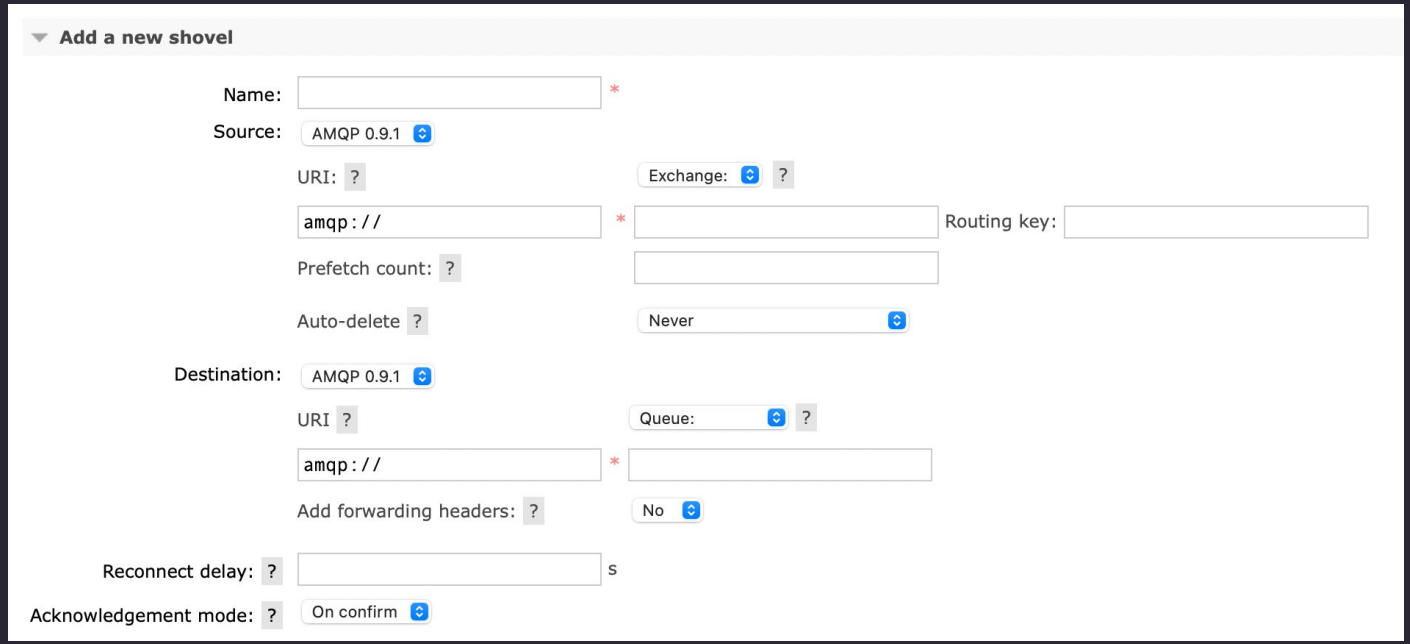
План урока

- **Shovel, federation** - полезные плагины
- **High Load** - высокая нагрузка
- **High Availability** - отказоустойчивость
- **Практика** (демонстрация)
- **Практическое задание**

Shovel

- По сути просто **интегрированный в RabbitMQ consumer+publisher**
- Можно запустить **на любой стороне**
- Бывает **динамический** и **статический**
- Работает **довольно быстро**
- **Сложноват** в траблшутинге
- **Не умеет** ни в какую, даже самую базовую **логику**
- **Работает в кластере**

Shovel



Federation

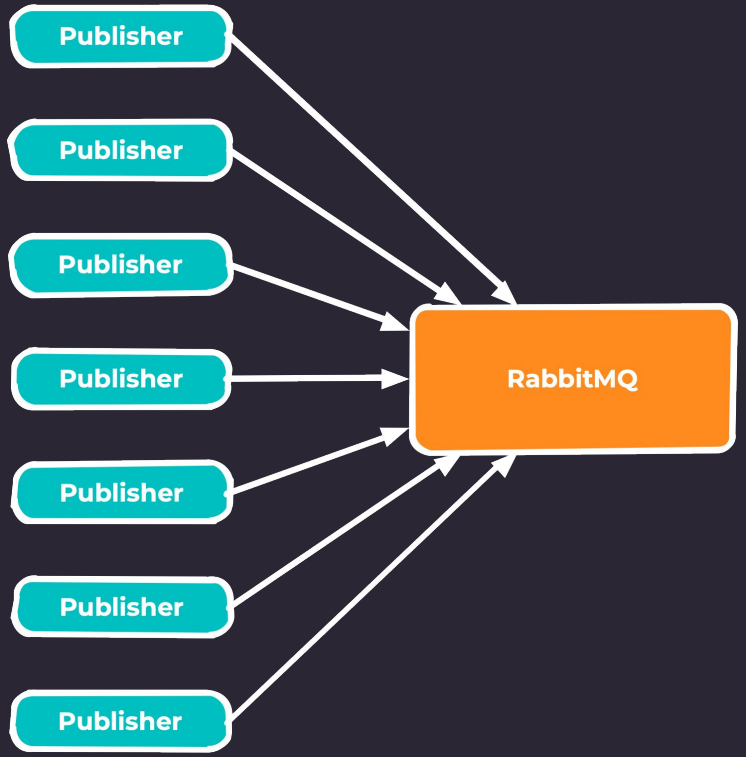
- Есть отдельные понятия **federation exchange** и **federation queue**
- Настройка происходит с downstream серверов в сторону upstream
- Все минусы shovel

High Load

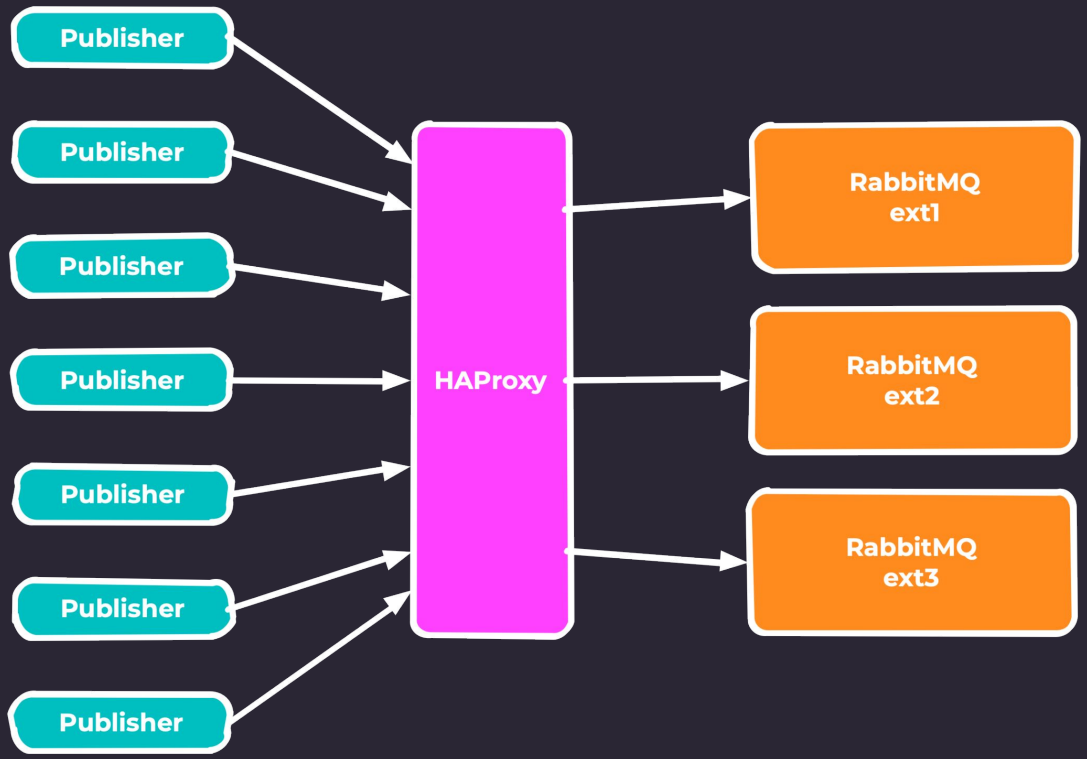
- Большое количество **соединений** от паблишеров
- Большой поток **сообщений**
- Большое количество **открытий/закрытий коннектов/каналов**
- Сообщения **не успевают обрабатываться**

Большое количество соединений от паблишеров

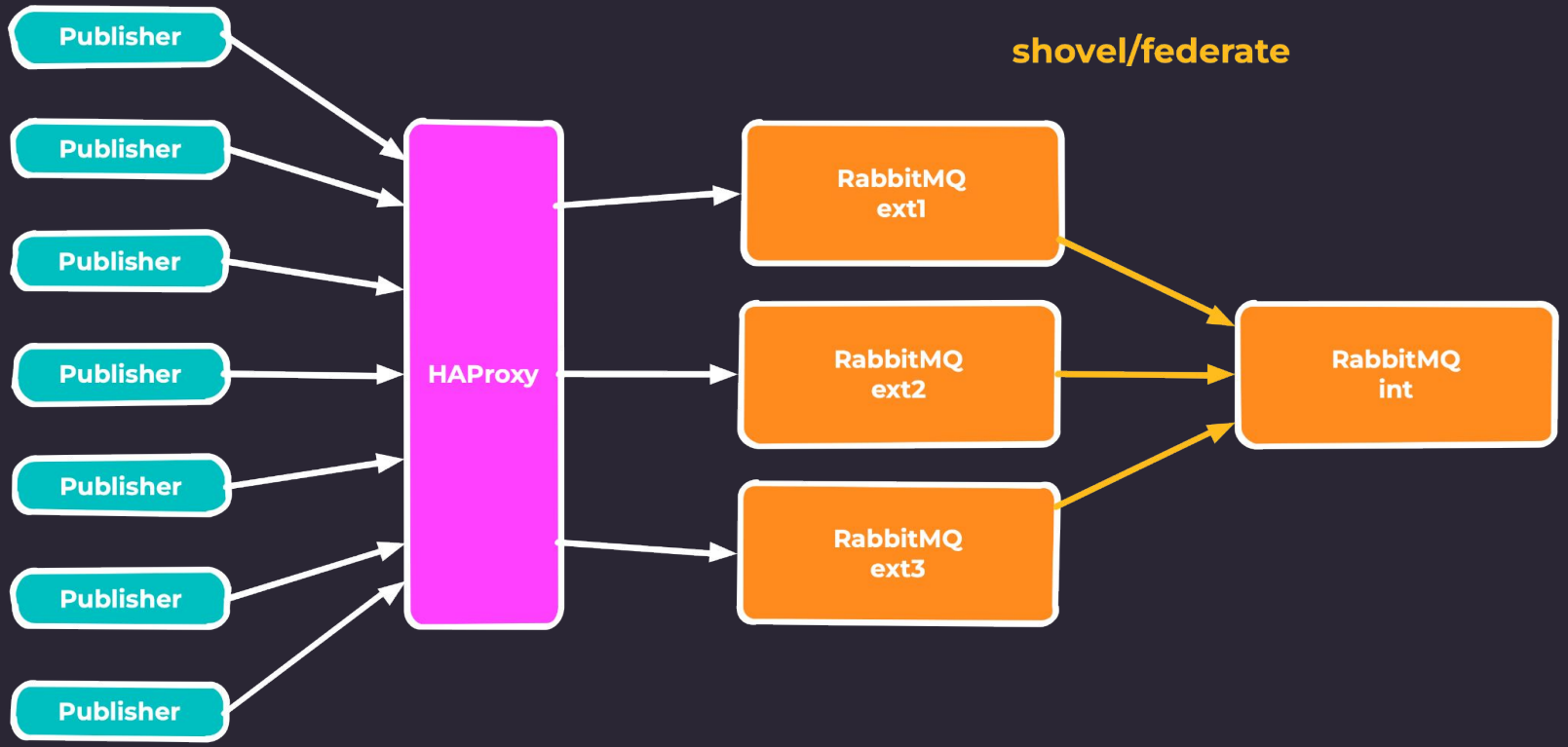
Большое количество соединений от паблишеров



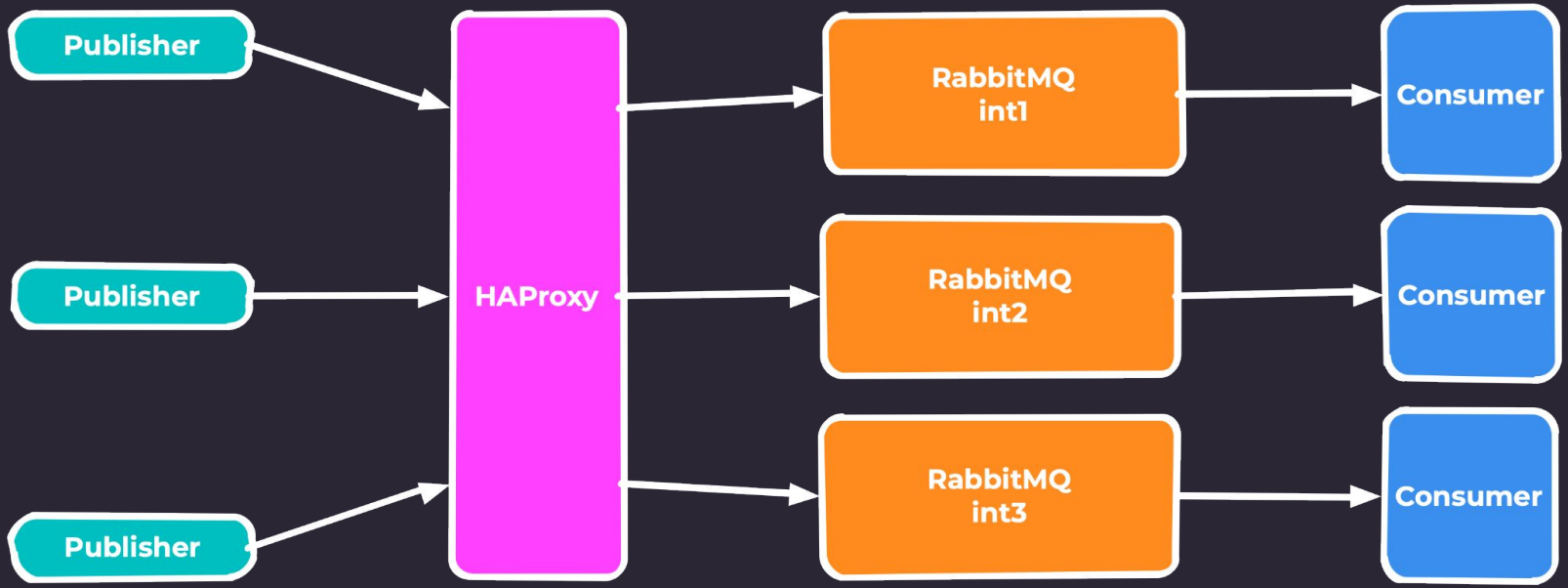
Большое количество соединений от паблишеров



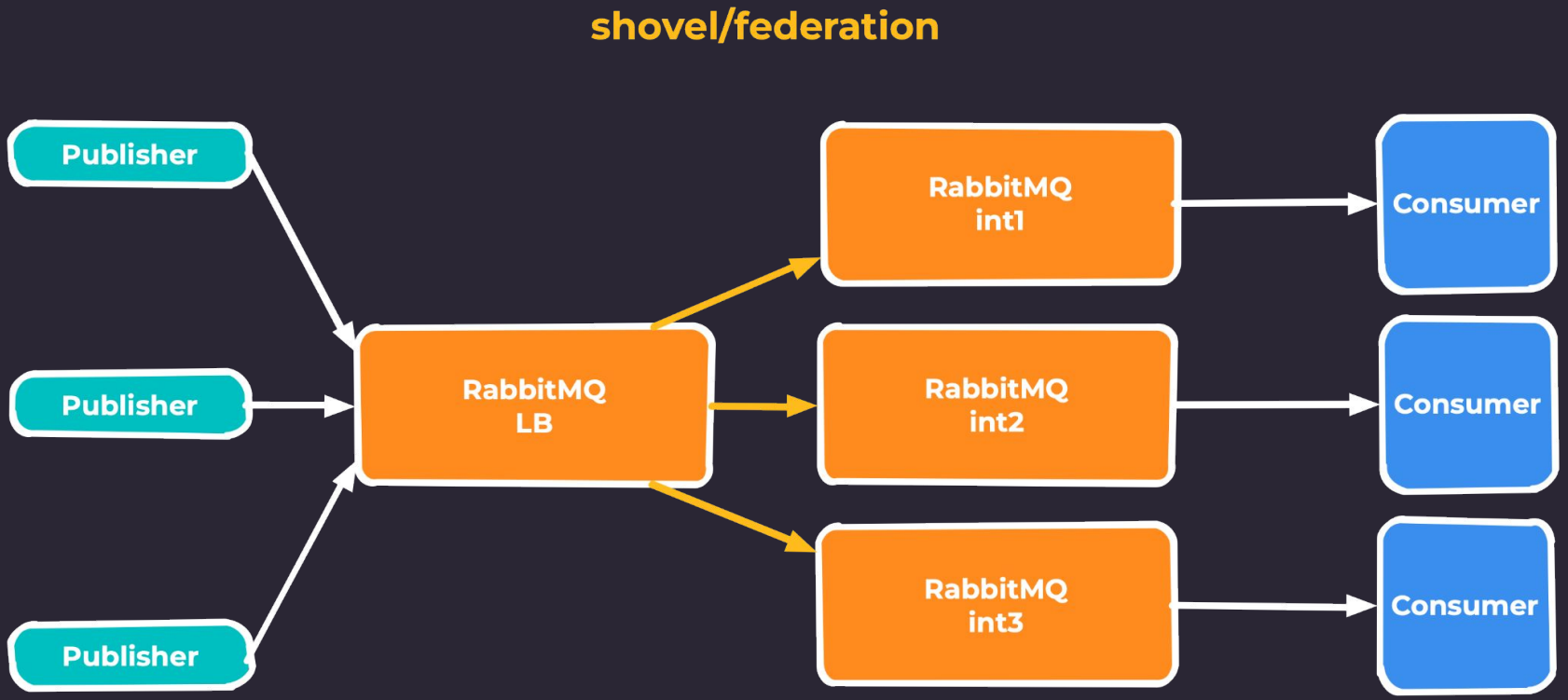
Большое количество соединений от паблишеров



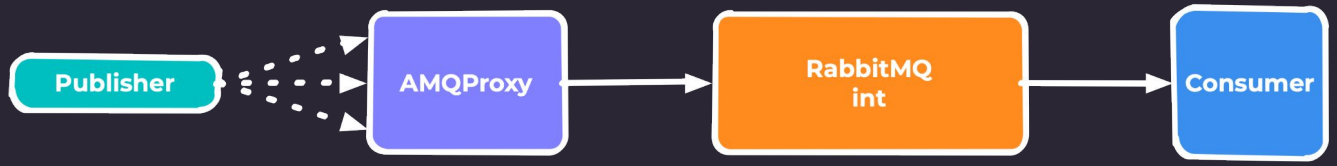
Большой поток сообщений



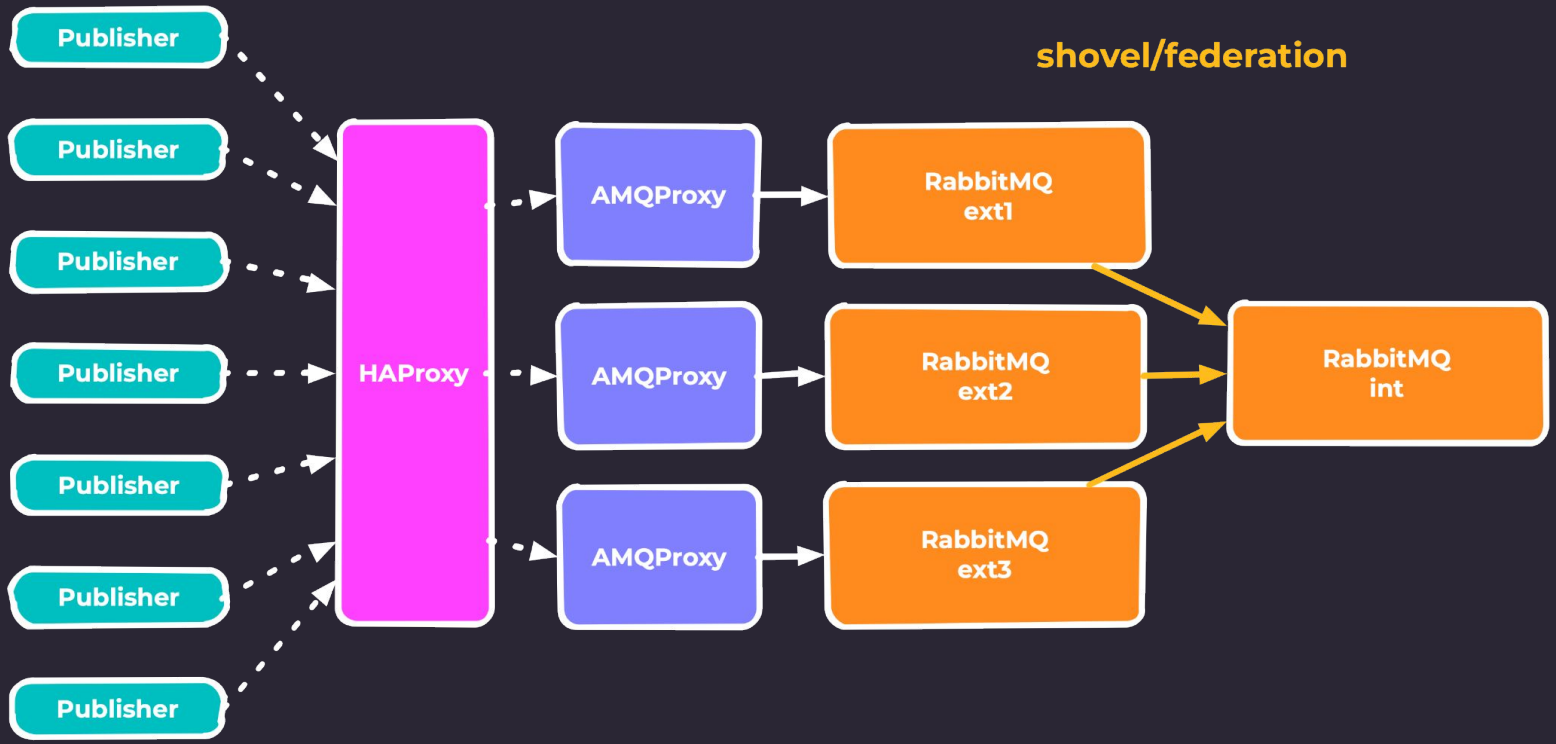
Большой поток сообщений



Большое количество открытий/закрытий коннектов/каналов



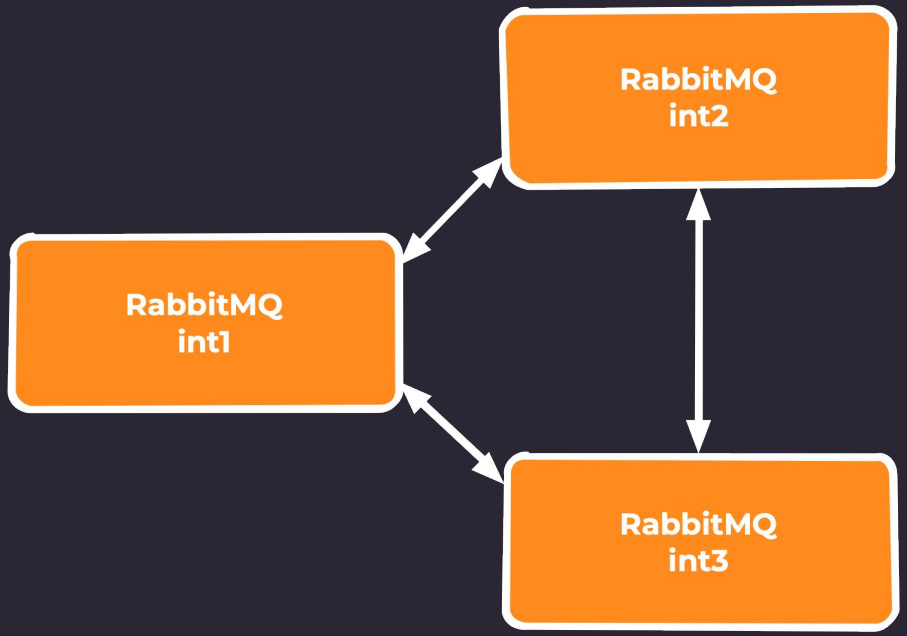
Большое количество открытий/закрытий коннектов/каналов



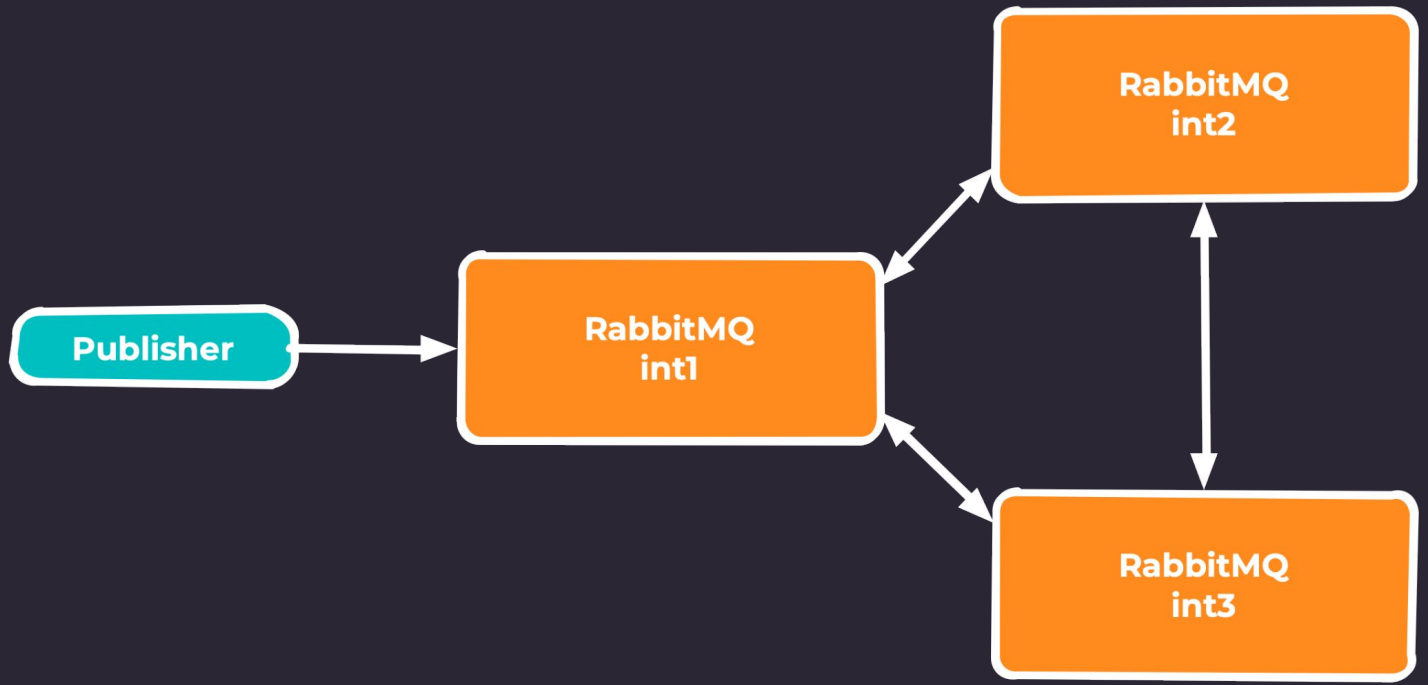
High Availability

- **Кластеризация** - репликация очередей
- **Мастер** для каждой очереди может быть **только один**
- **Автоматическое проксирование** запросов на мастер
- **Quorum queue** - тип очереди
- **Shovel/federation** - механизмы зеркалирования между ДЦ
- **HAProxy** - балансировщик

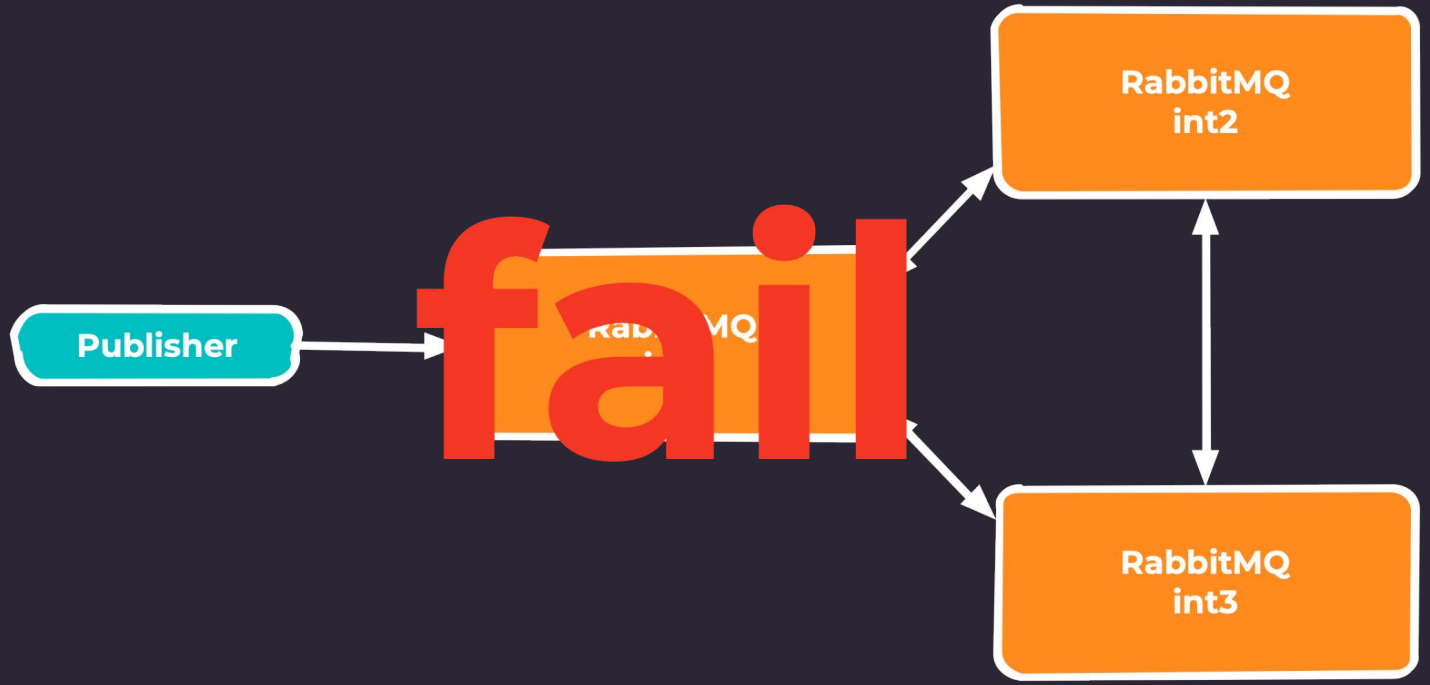
Кластер



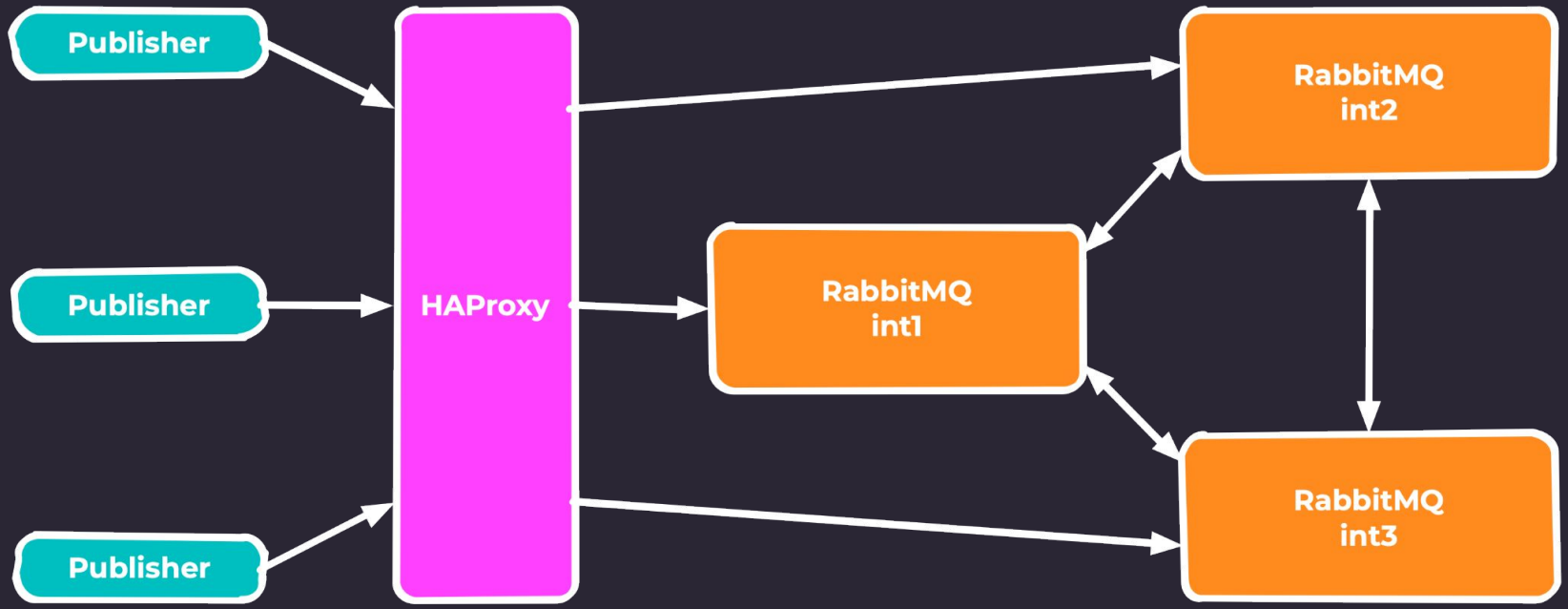
Кластер



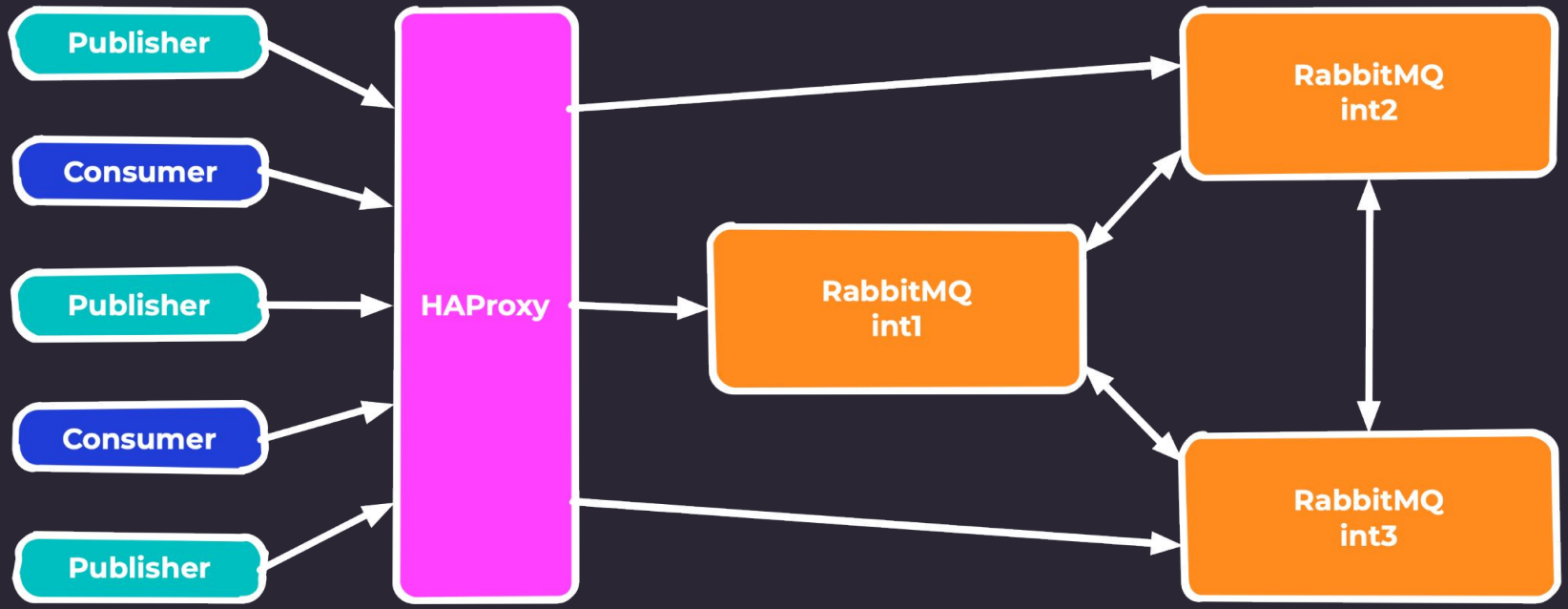
Кластер



Кластер



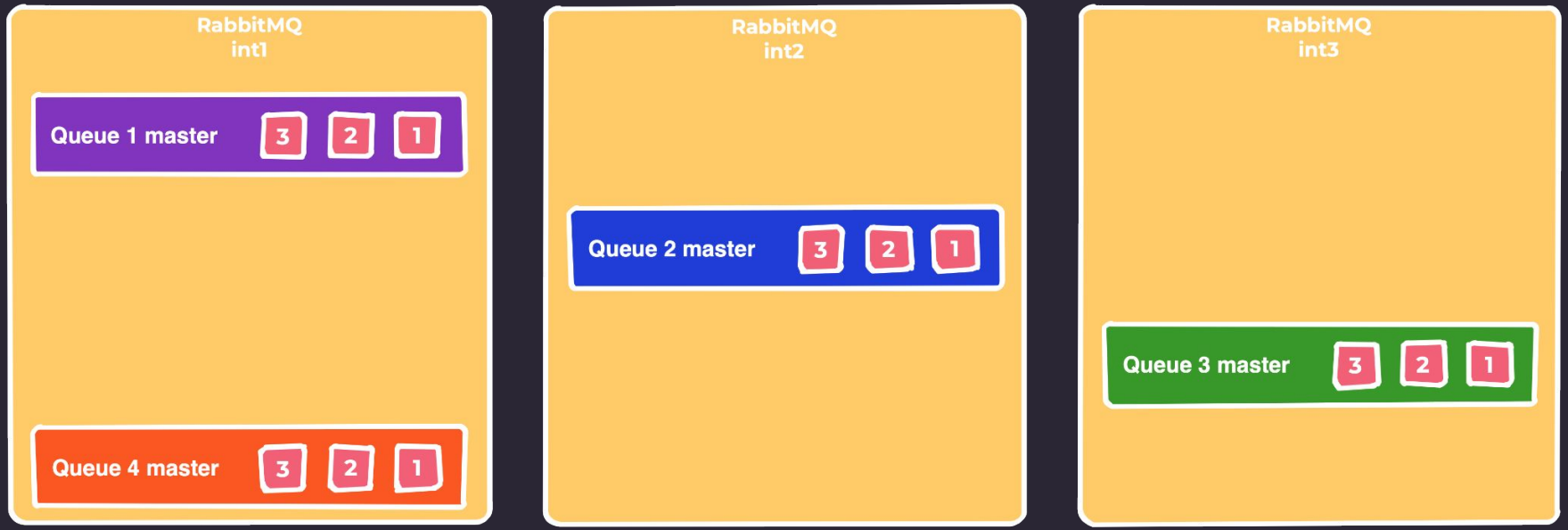
Кластер



Policy HA

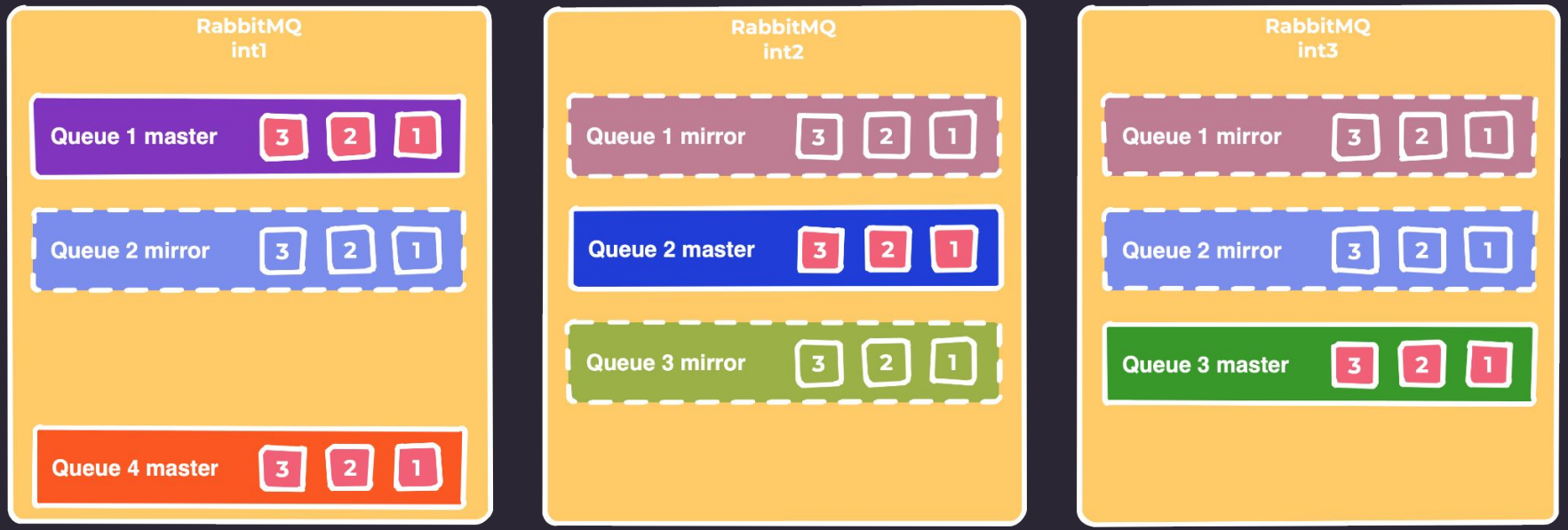
- **ha-mode: exactly** - по количеству реплик (ha-params=2)
- **ha-mode: all** - на все ноды кластера
- **ha-mode: nodes** - на определенные ноды (ha-params={nodenames})
- **ha-sync-mode: manual** - default, полуручное управление
- **ha-sync-mode: automatic** - автоматическая синхронизация

HA queues

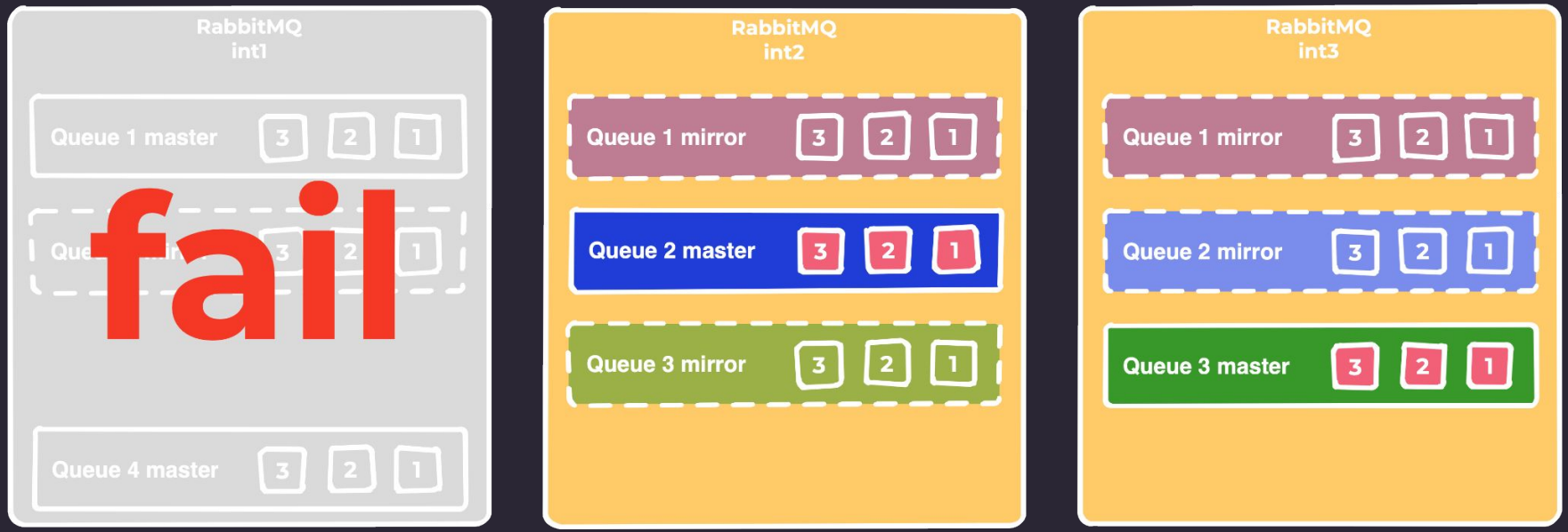


HA queues

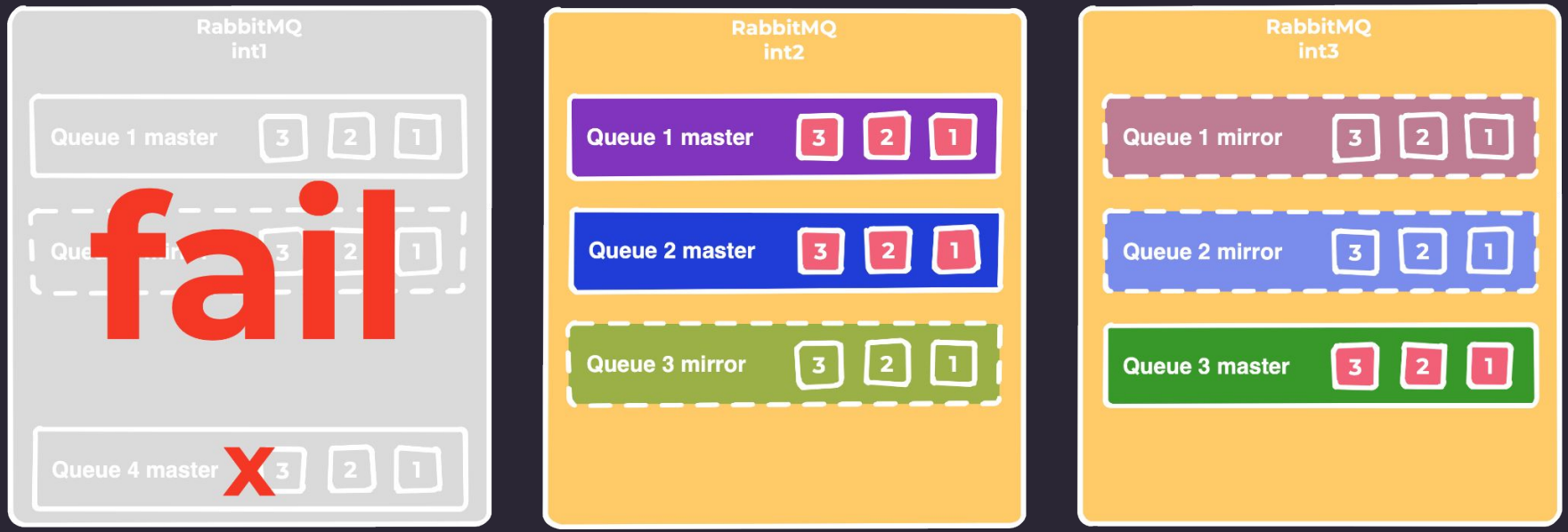
ha-mode: exactly
ha-sync-mode: automatic
ha-params:
Queue 1: 3 **Queue 2:** 3 **Queue 3:** 2 **Queue 4:** 1



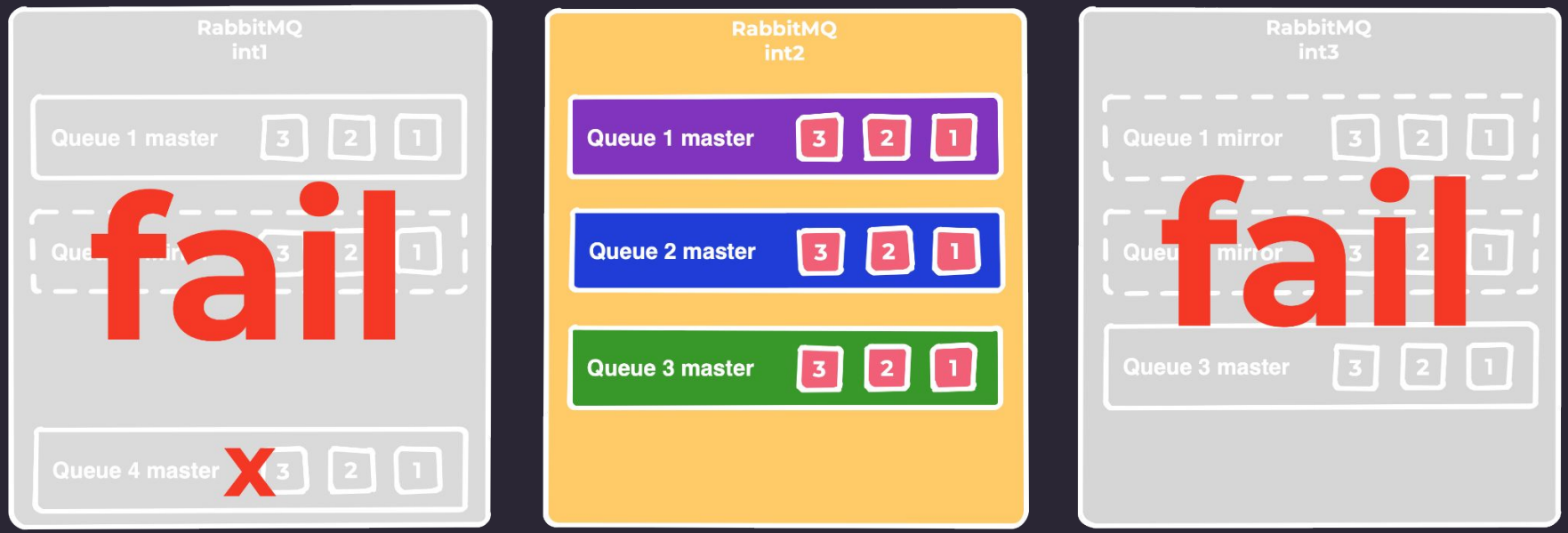
HA queues



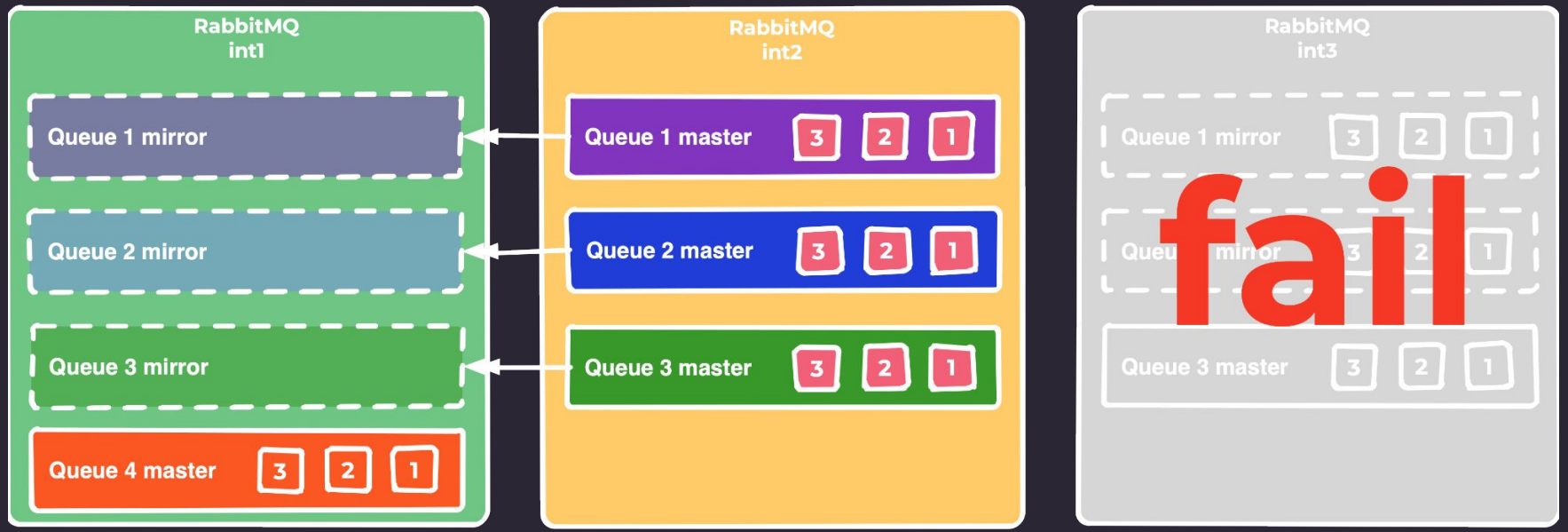
HA queues



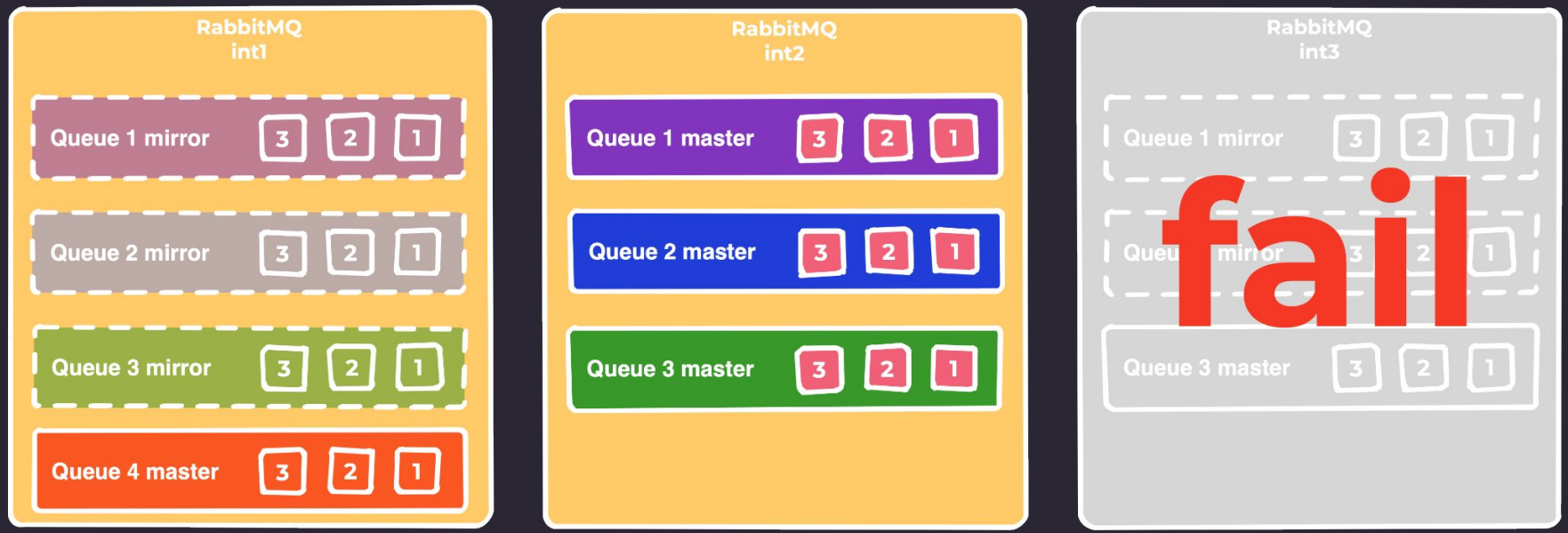
HA queues



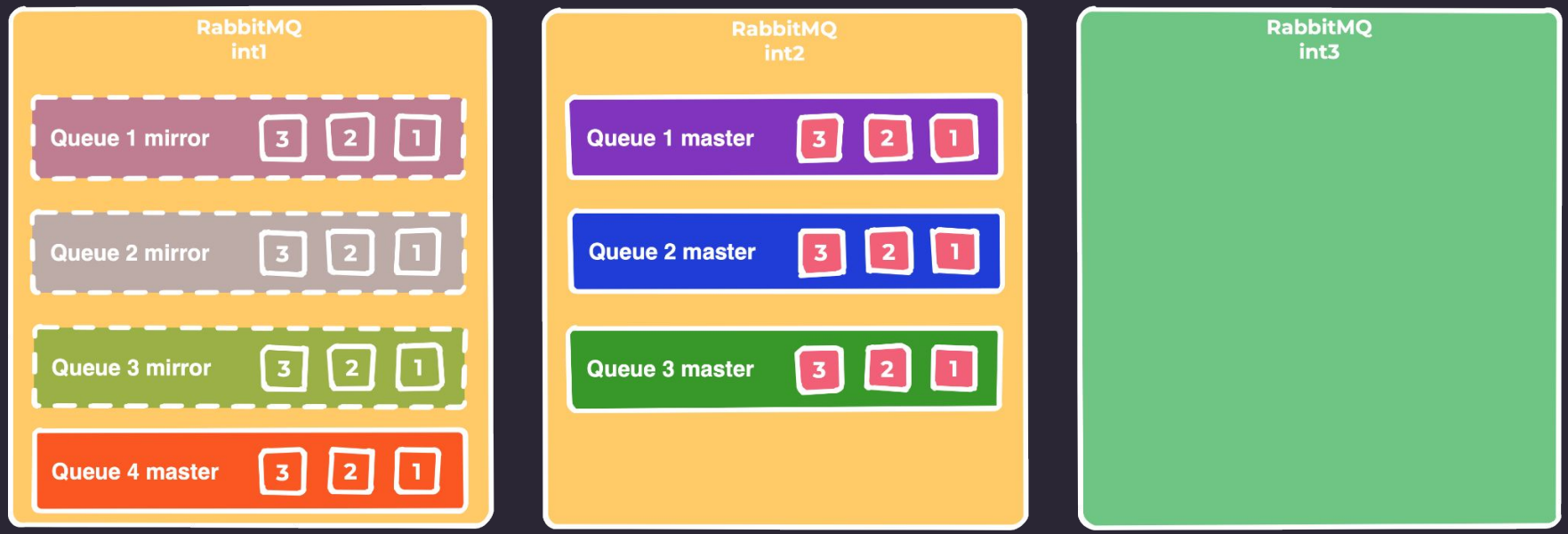
HA queues



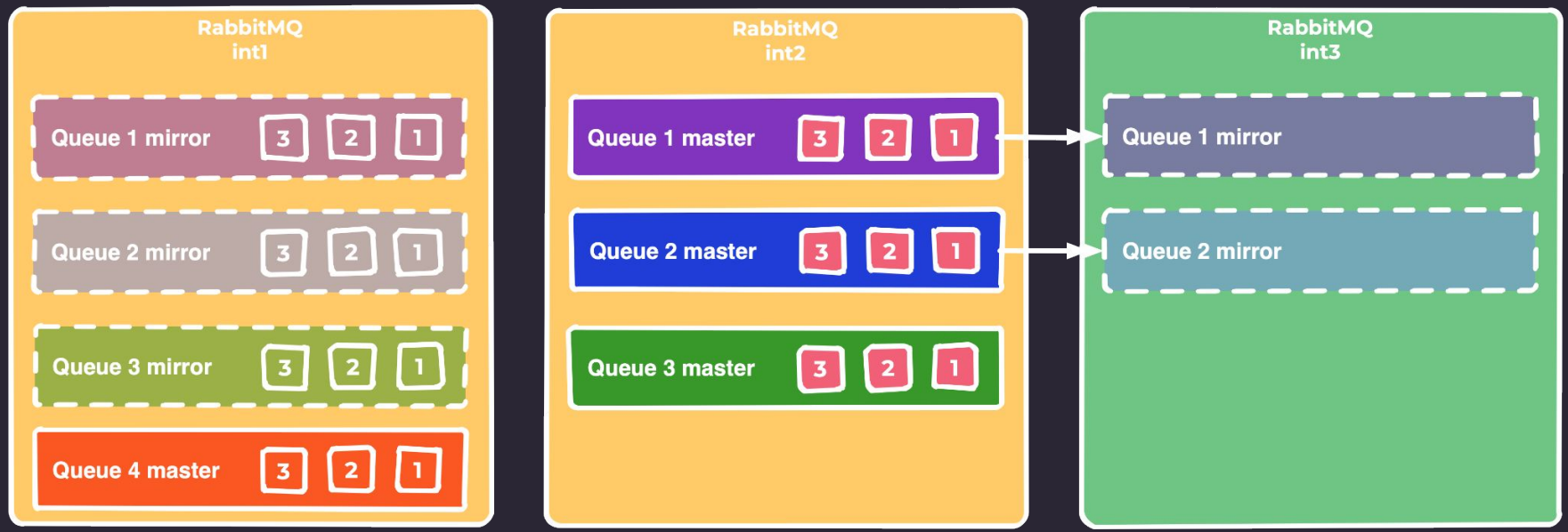
HA queues



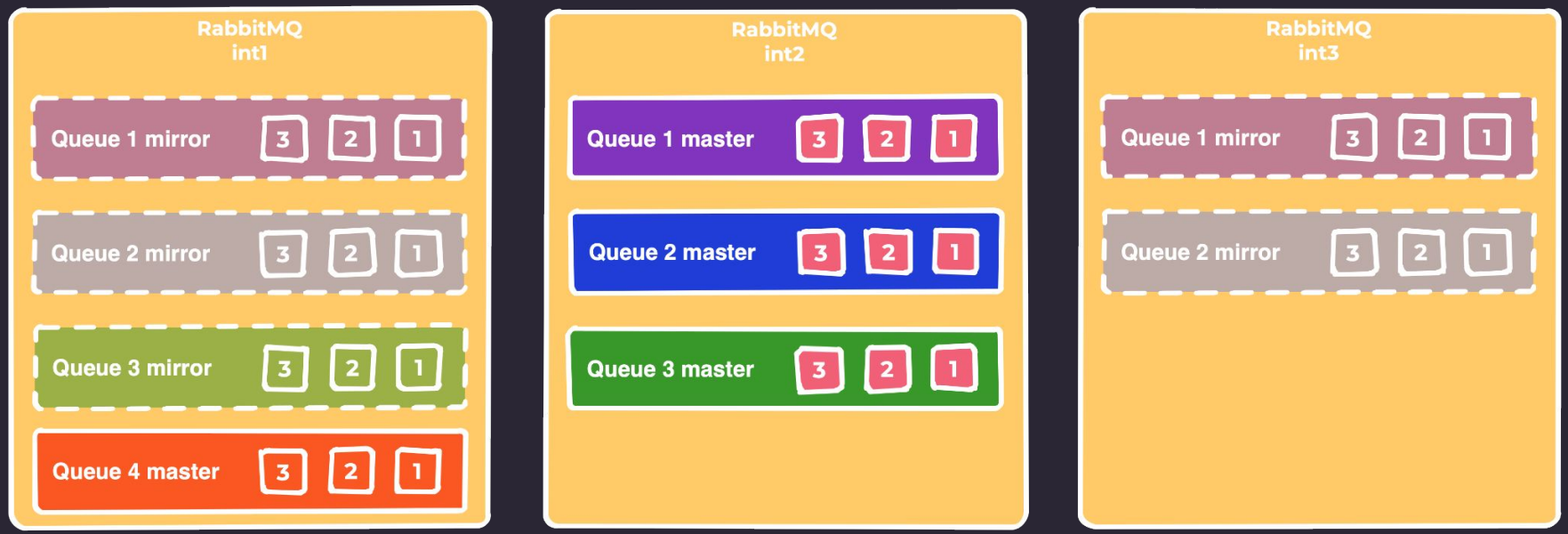
HA queues



HA queues



HA queues



Настройка кластера

```
  rabbitmq1:
    image: rabbitmq:3.10.7-management
    hostname: rabbitmq1
    restart: always
    environment:
      RABBITMQ_DEFAULT_USER: rmuser
      RABBITMQ_DEFAULT_PASS: rmpassword
      RABBITMQ_ERLANG_COOKIE: SUPER1SECRET1COOKIE
      RABBITMQ_SERVER_ADDITIONAL_ERL_ARGS: -rabbit log_levels
[{connection,error},{default,error}] disk_free_limit 2147483648
    volumes:
      - ./rabbitmq-1:/var/lib/rabbitmq
    ports: ["15672:15672"]
```

Настройка кластера

Cluster Formation and Peer Discovery

Clustering Guide

Настройка кластера

```
  rabbitmq2:
    image: rabbitmq:3.10.7-management
    hostname: rabbitmq2
    restart: always
    environment:
      RABBITMQ_DEFAULT_USER: rmuser
      RABBITMQ_DEFAULT_PASS: rmpassword
      RABBITMQ_ERLANG_COOKIE: SUPER1SECRET1COOKIE
      RABBITMQ_SERVER_ADDITIONAL_ERL_ARGS: -rabbit log_levels
[{connection,error},{default,error}] disk_free_limit 2147483648
    volumes:
      - ./rabbitmq-2:/var/lib/rabbitmq
    ports: ["15673:15672"]
```

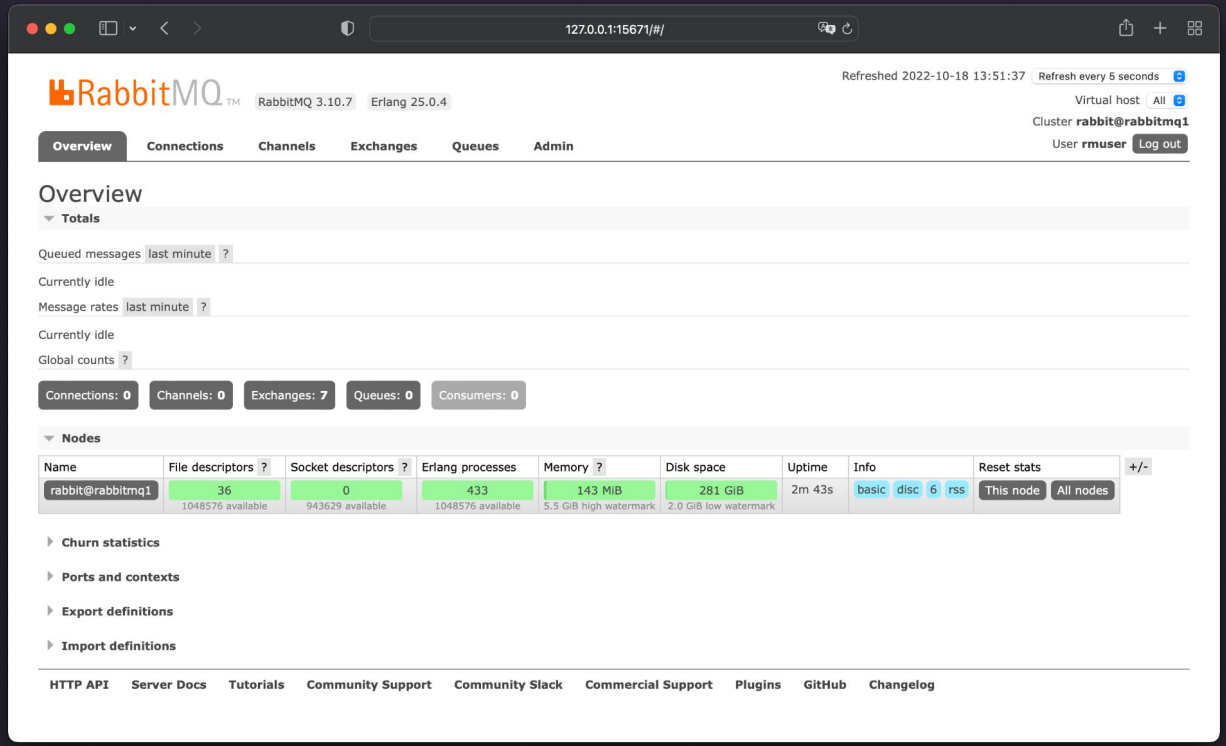
Настройка кластера

```
  rabbitmq3:
    image: rabbitmq:3.10.7-management
    hostname: rabbitmq3
    restart: always
    environment:
      RABBITMQ_DEFAULT_USER: rmuser
      RABBITMQ_DEFAULT_PASS: rmpassword
      RABBITMQ_ERLANG_COOKIE: SUPER1SECRET1COOKIE
      RABBITMQ_SERVER_ADDITIONAL_ERL_ARGS: -rabbit log_levels
[{connection,error},{default,error}] disk_free_limit 2147483648
    volumes:
      - ./rabbitmq-3:/var/lib/rabbitmq
    ports: ["15674:15672"]
```

Настройка кластера

```
docker-compose up -d
```

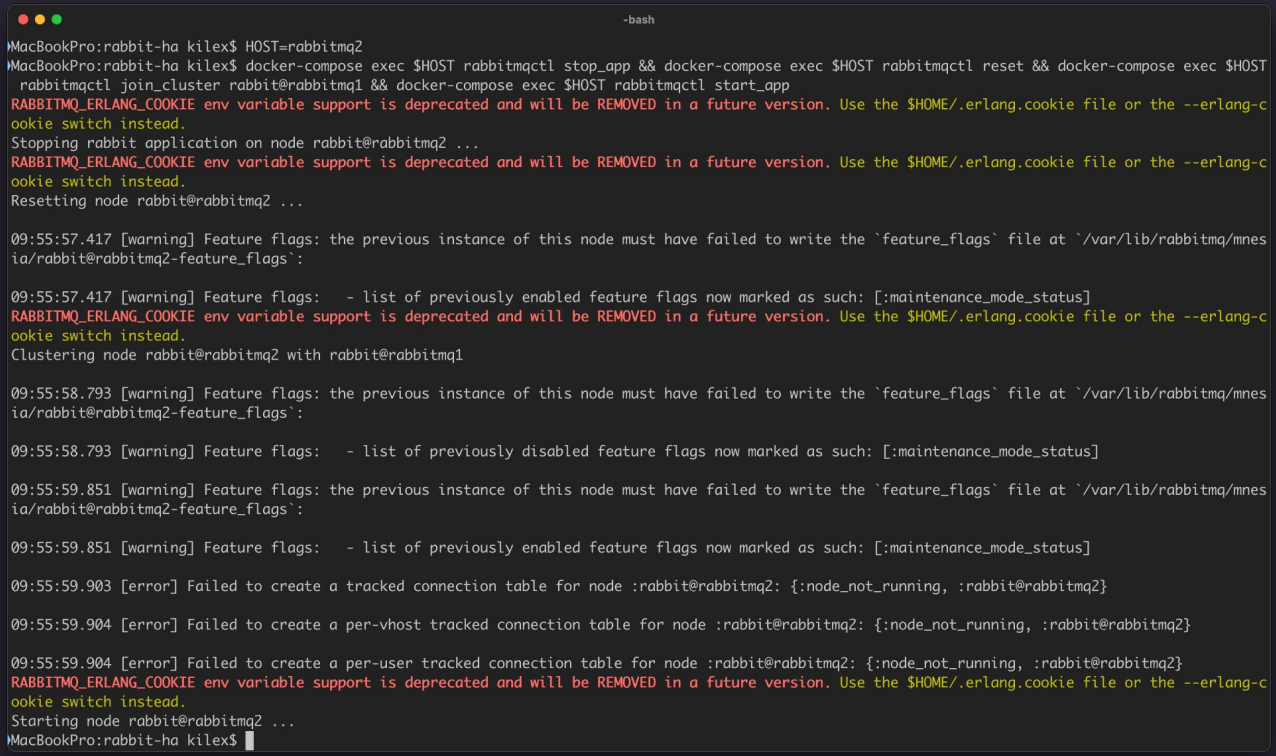
Настройка кластера



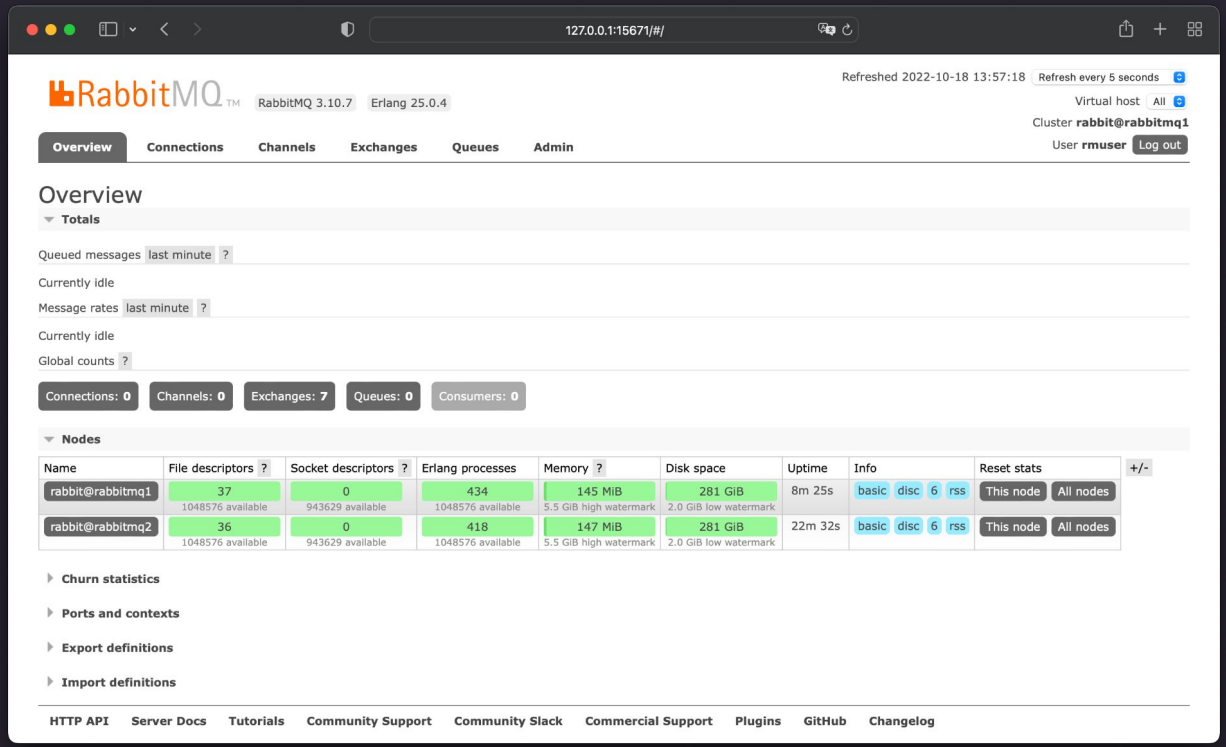
Настройка кластера

```
HOST=rabbitmq2

docker-compose exec $HOST rabbitmqctl stop_app

docker-compose exec $HOST rabbitmqctl reset

docker-compose exec $HOST rabbitmqctl join_cluster rabbit@rabbitmq1

docker-compose exec $HOST rabbitmqctl start_app
```

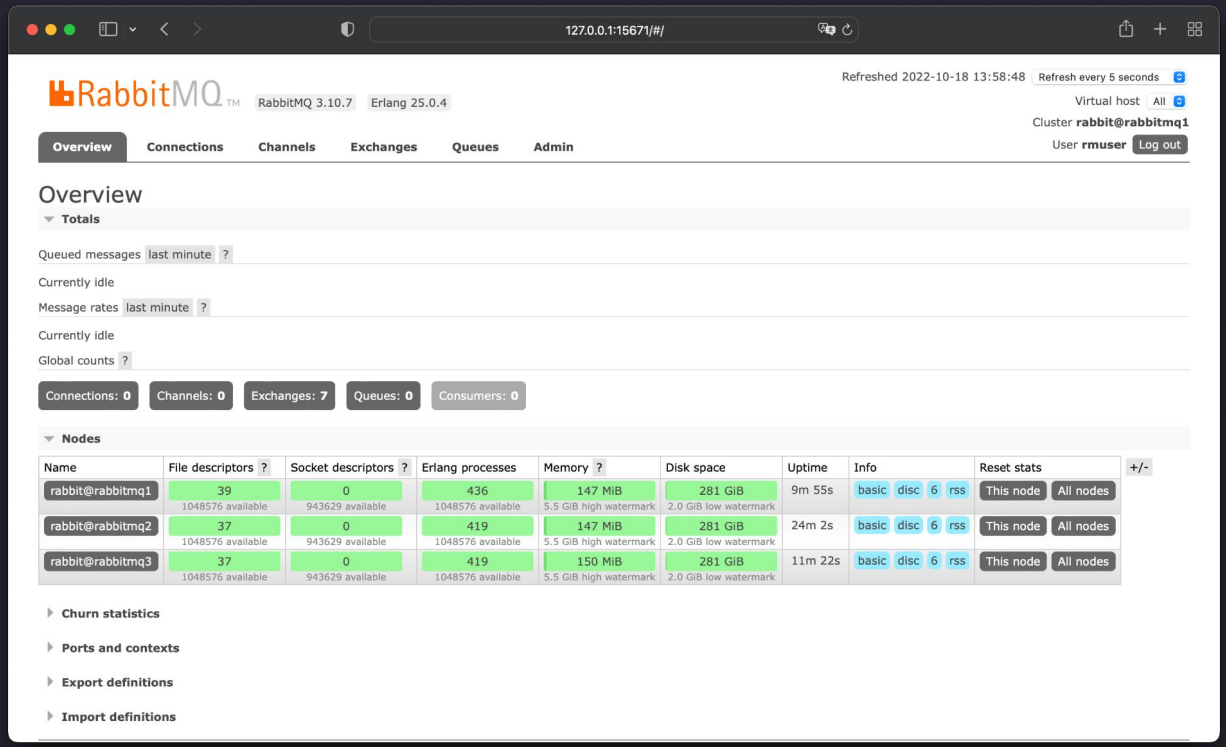
Настройка кластера



Настройка кластера



Настройка кластера

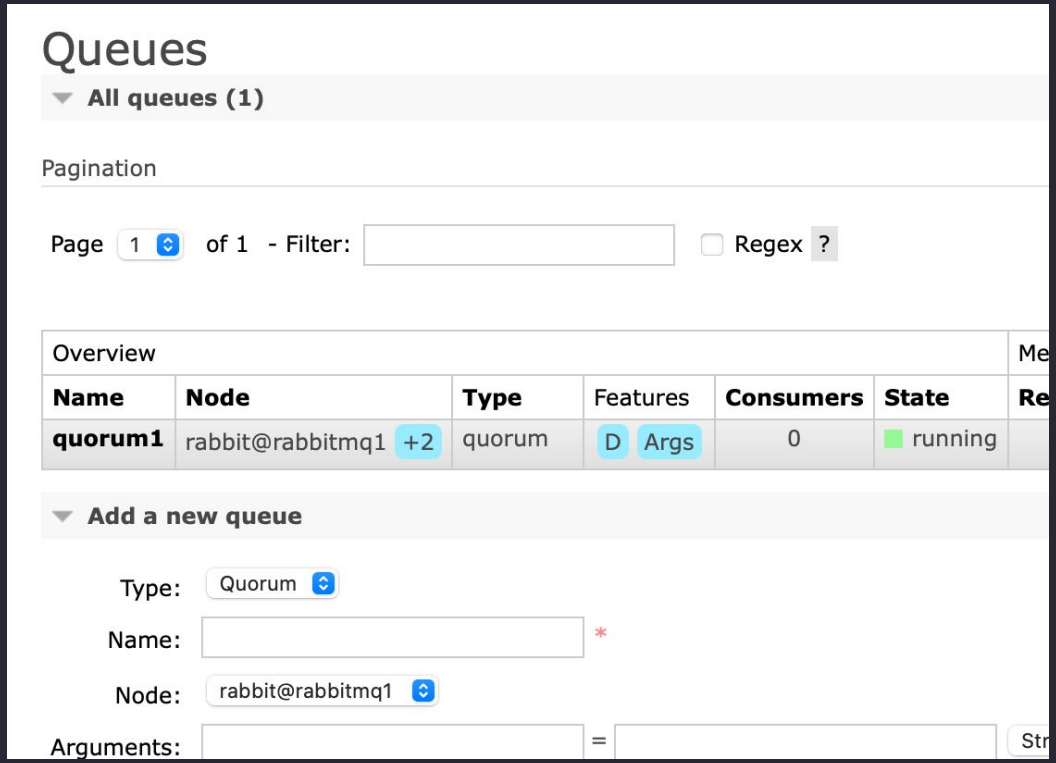


Настройка кластера

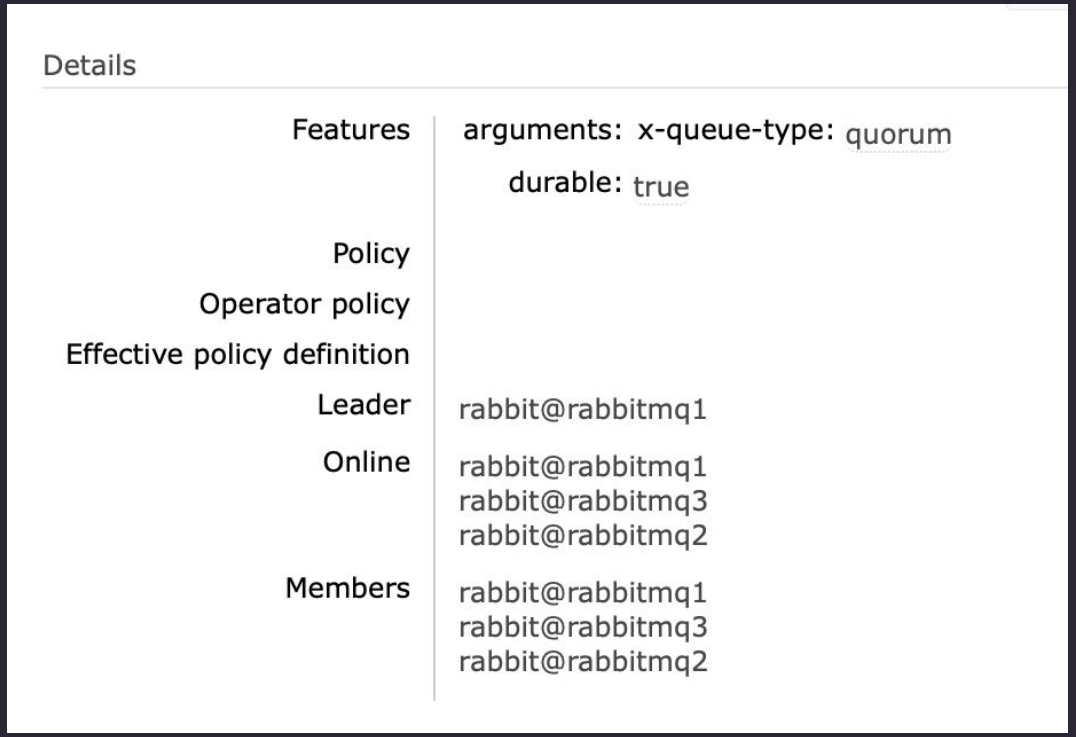
```
HOST=rabbitmq4

docker-compose exec $HOST rabbitmqctl stop_app

docker-compose exec $HOST rabbitmqctl reset

docker-compose exec $HOST rabbitmqctl start_app
```

Quorum queue

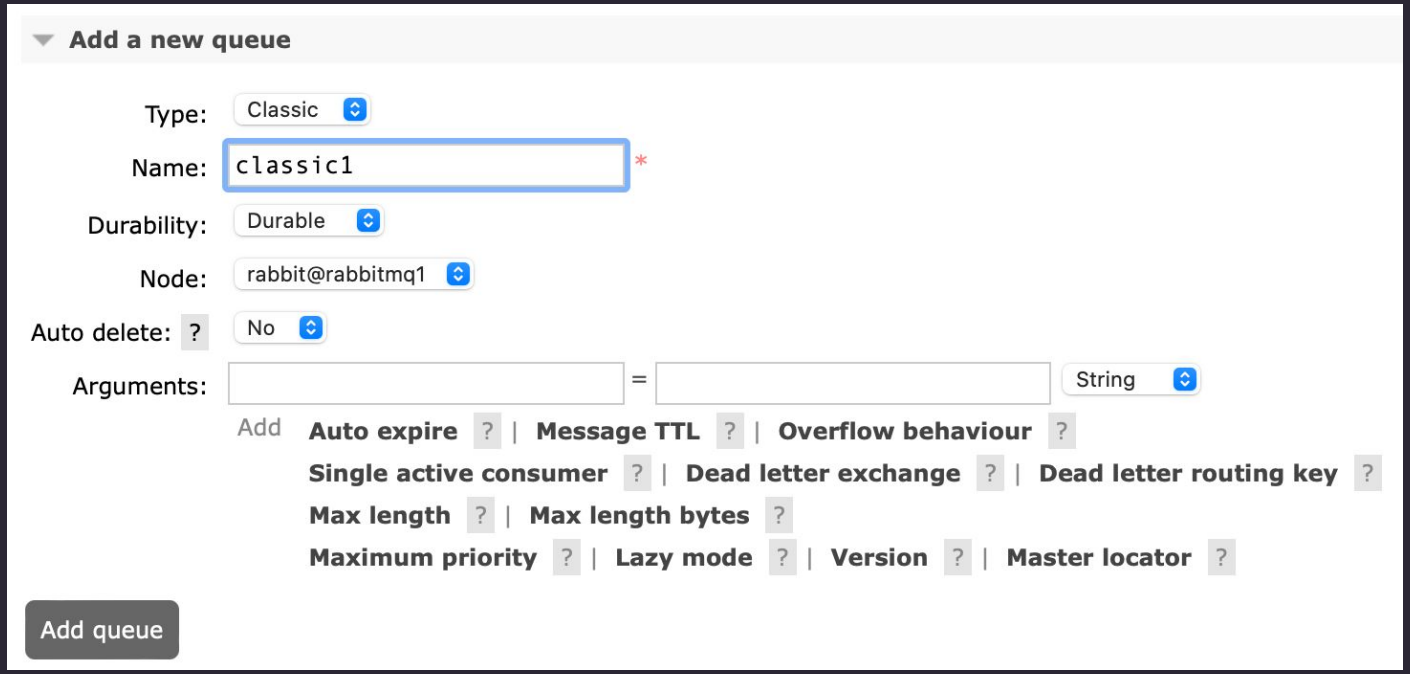
Quorum queue



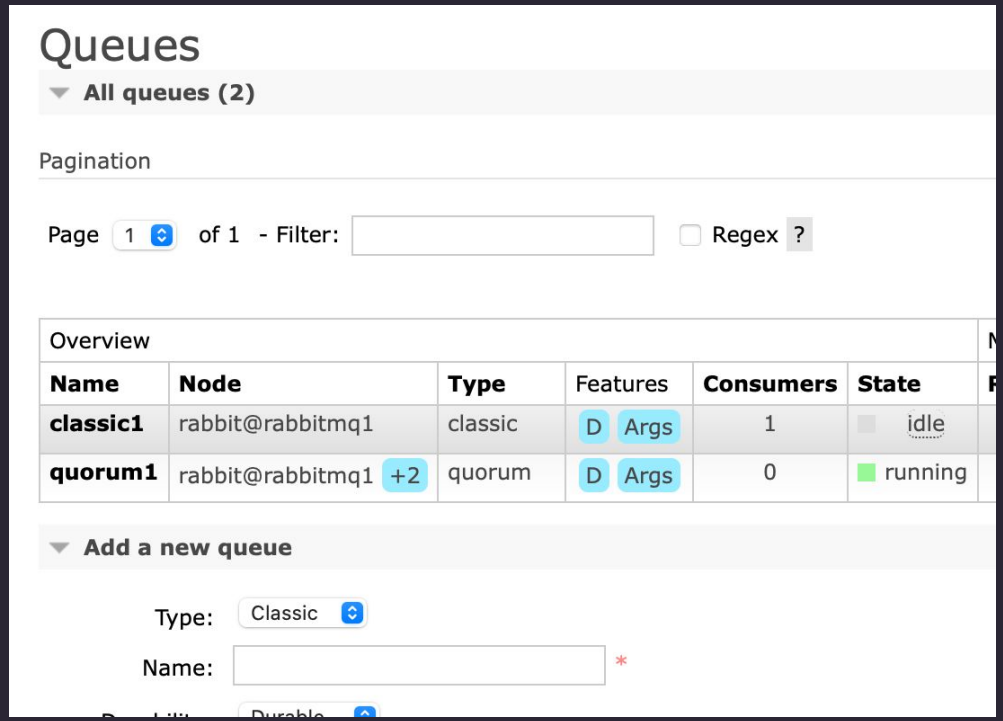
Quorum queue



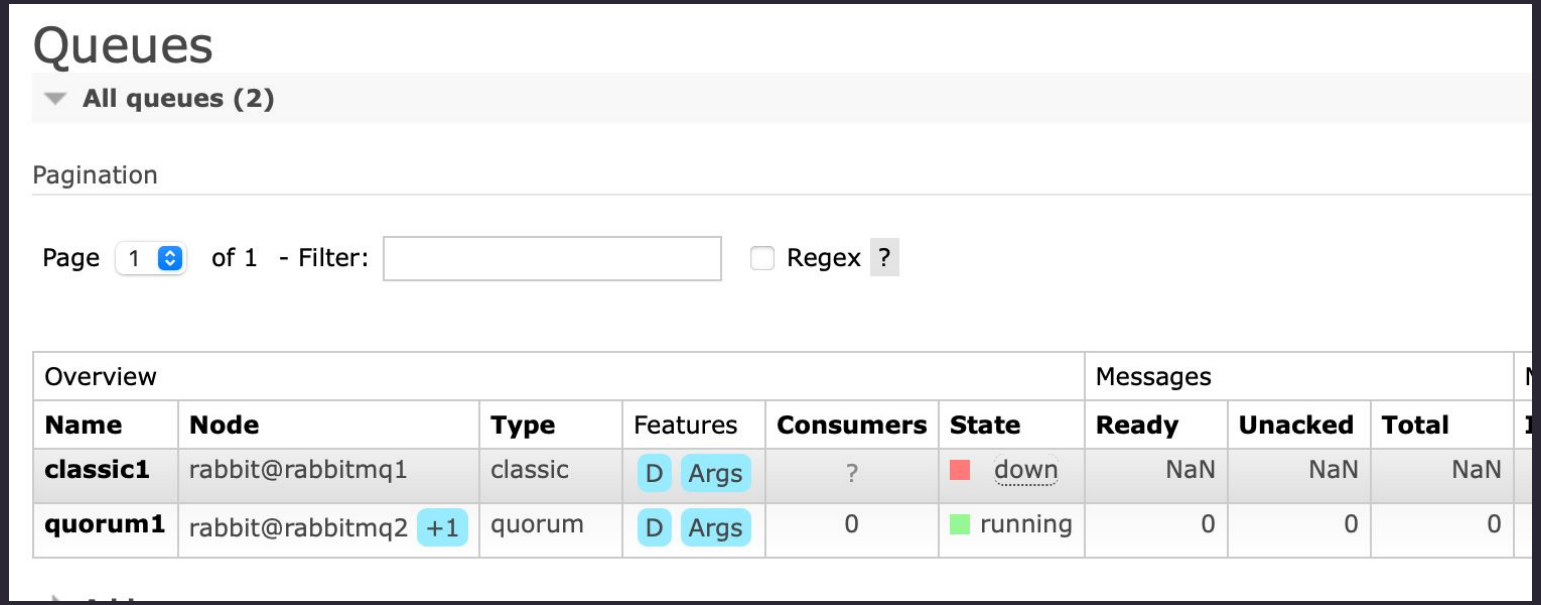
Classic queue



Classic queue



Classic queue



Queues

All queues (2)

Pagination

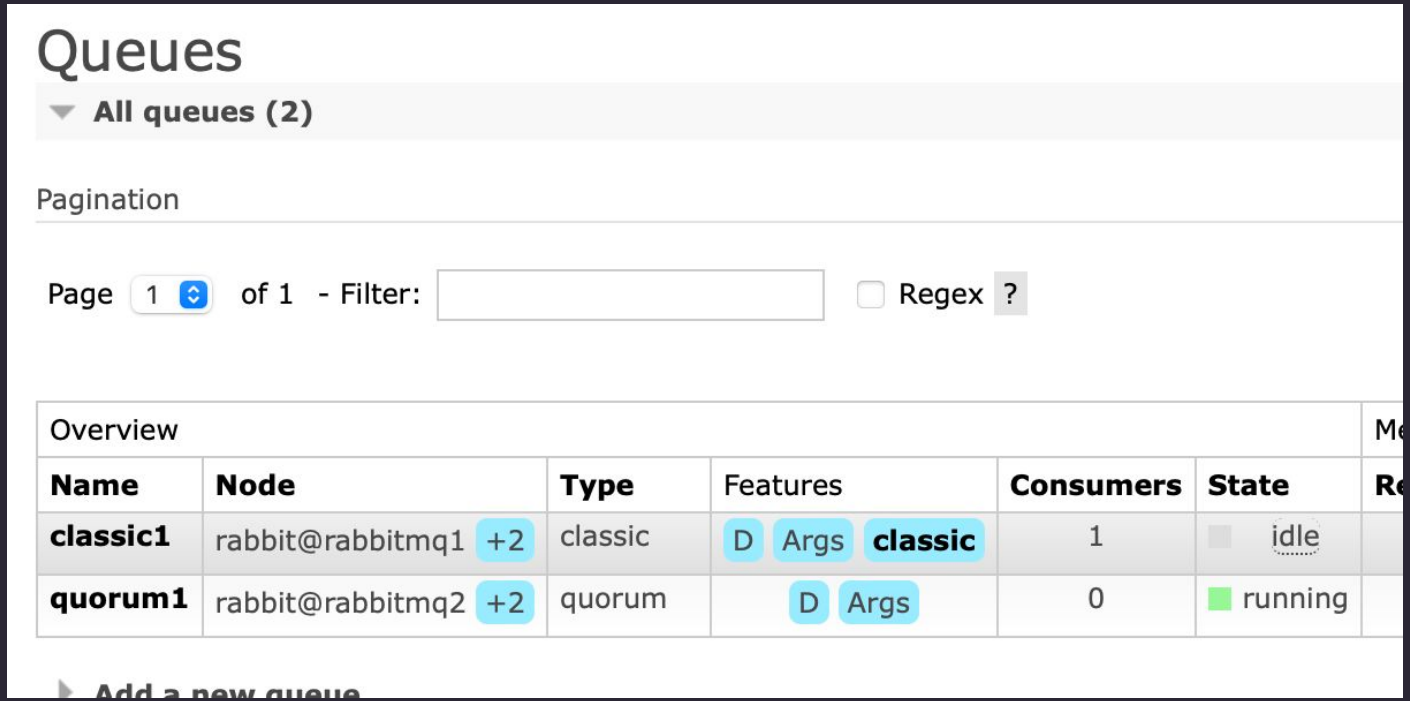
Page 1 of 1 - Filter: Regex ?

Overview						Messages		
Name	**Node**	**Type**	Features	**Consumers**	**State**	**Ready**	**Unacked**	**Total**
classic1	rabbit@rabbitmq1	classic	D Args	?	down	NaN	NaN	NaN
quorum1	rabbit@rabbitmq2 +1	quorum	D Args	0	running	0	0	0

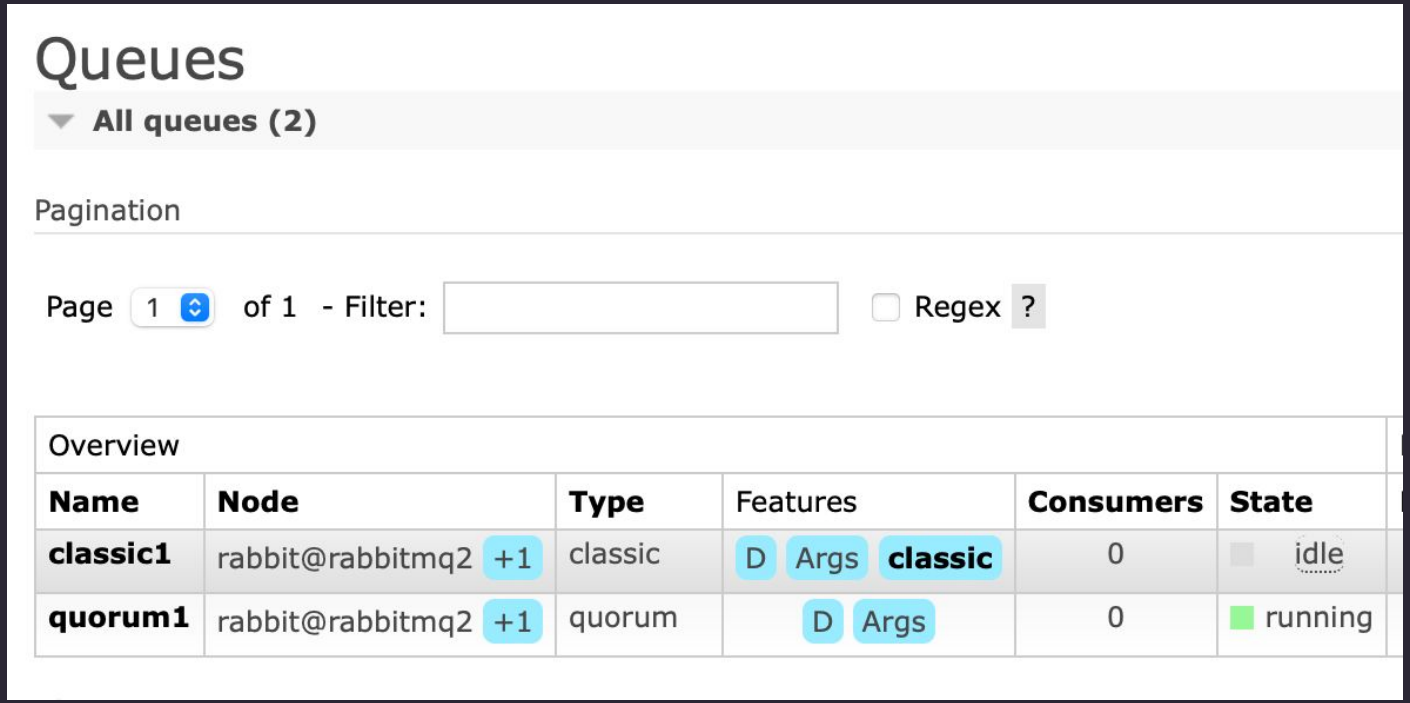
Classic queue

Name	Pattern	Apply to	Definition	Priority
classic	^classic.*	queues	ha-mode: exactly ha-params: 3 ha-sync-mode: automatic	5

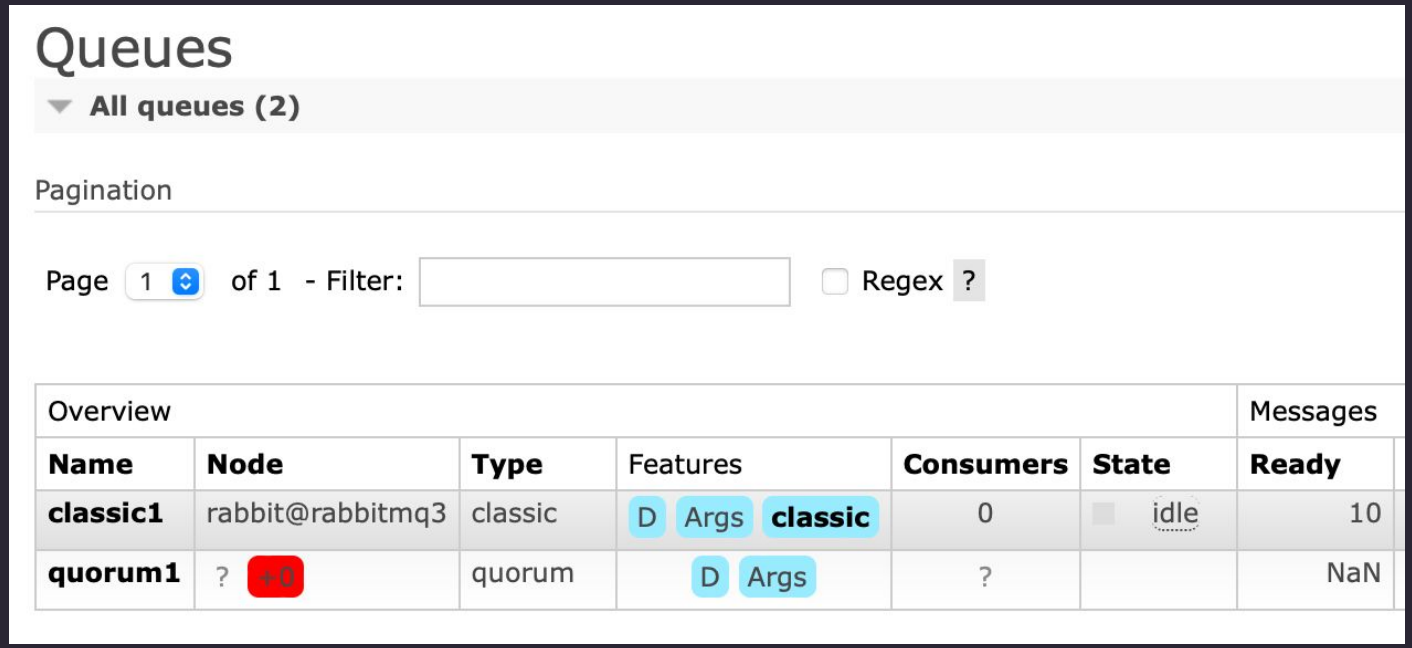
Classic queue



Classic queue



Classic queue



Queues

All queues (2)

Pagination

Page 1 of 1 - Filter: Regex ?

Overview						Messages
Name	**Node**	**Type**	Features	**Consumers**	**State**	**Ready**
classic1	rabbit@rabbitmq3	classic	D Args **classic**	0	idle	10
quorum1	? +0	quorum	D Args	?		NaN

HAProxy

```
lb:
  image: haproxy:2.6.6-alpine
  restart: always
  volumes:
    - ./haproxy.cfg:/usr/local/etc/haproxy/haproxy.cfg
  ports:
    - 15671:15672
  links:
    - rabbitmq1
    - rabbitmq2
    - rabbitmq3
```

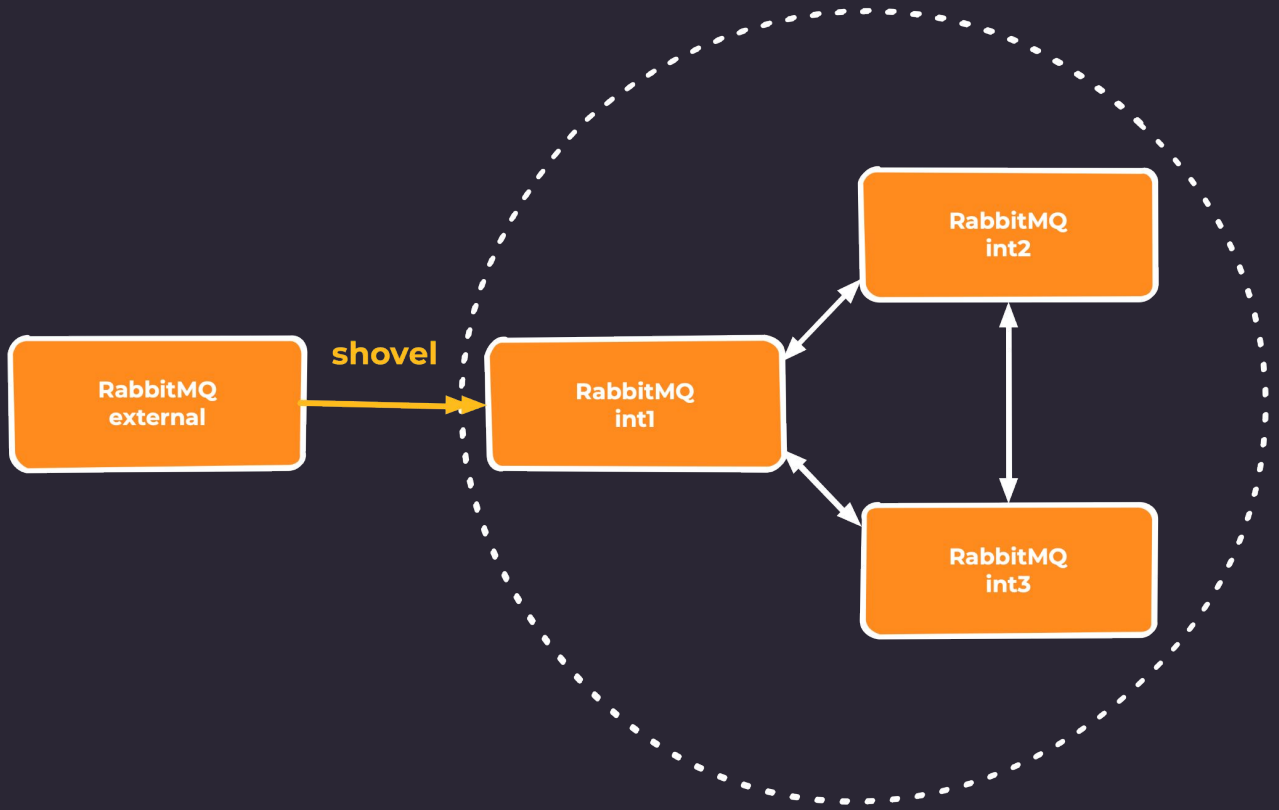
HAProxy

```
global
    daemon
    maxconn 10000

defaults
    mode    tcp
    timeout connect 5000
    timeout client  50000
    timeout server  50000

listen rabbitmq-web
    bind *:15672
    balance roundrobin
    server r1 rabbitmq1:15672 check inter 1s rise 2 fall 2
    server r2 rabbitmq2:15672 check inter 2s rise 2 fall 2 backup
    server r3 rabbitmq3:15672 check inter 2s rise 2 fall 2 backup
```

HAProxy

```
listen amqp
       bind :5672
       mode tcp
       option tcplog
       option clitcpka
       balance roundrobin
       server amqp1 rabbitmq1:5672 check inter 5s rise 2 fall 3
       server amqp2 rabbitmq2:5672 check inter 5s rise 2 fall 3
       server amqp3 rabbitmq3:5672 check inter 5s rise 2 fall 3
```

Shovel



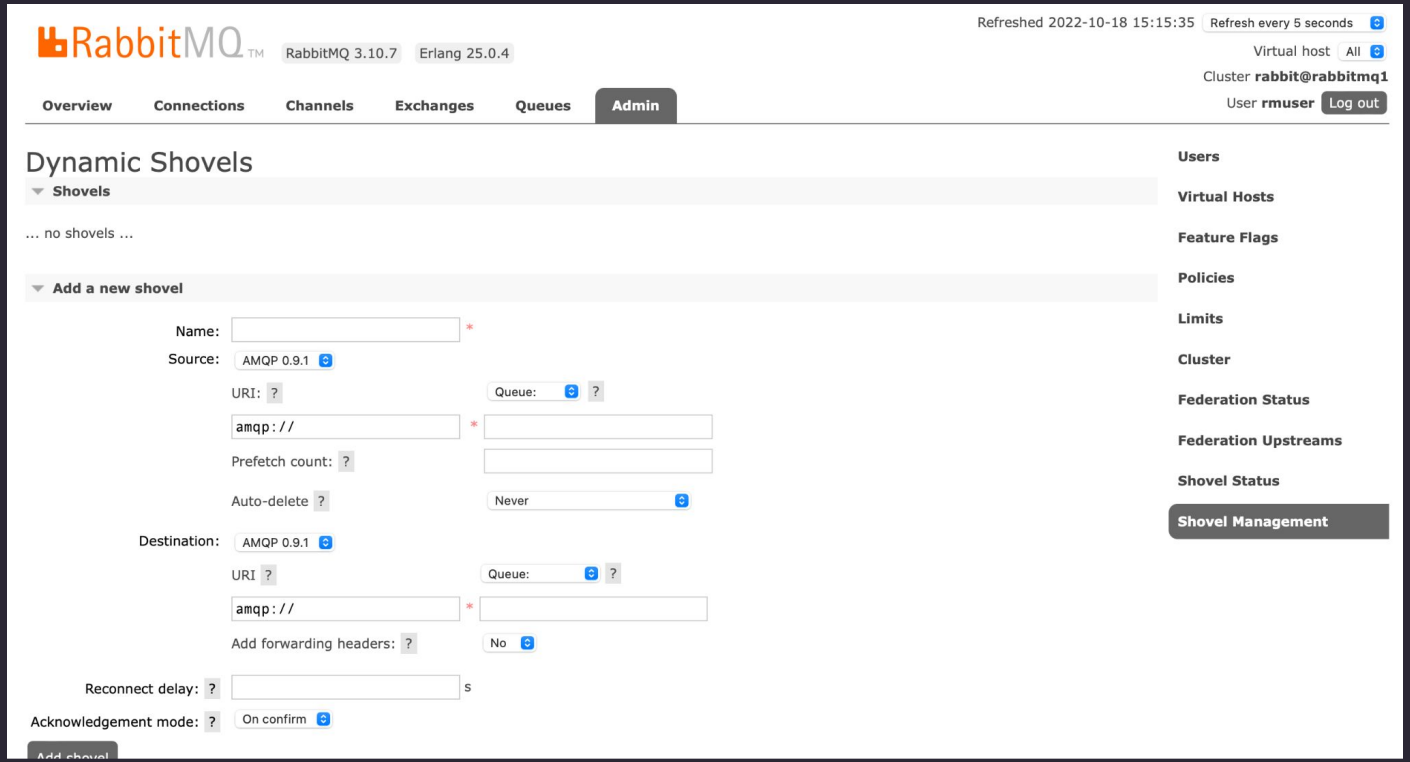
Shovel

```
  rabbitmq1:
    image: rabbitmq:3.10.7-management
    hostname: rabbitmq1
    restart: always
    environment:
      RABBITMQ_DEFAULT_USER: rmuser
      RABBITMQ_DEFAULT_PASS: rmpassword
      RABBITMQ_ERLANG_COOKIE: SUPER1SECRET1COOKIE
      RABBITMQ_SERVER_ADDITIONAL_ERL_ARGS: -rabbit log_levels
[{connection,error},{default,error}] disk_free_limit 2147483648
    volumes:
      - ./rabbitmq-1:/var/lib/rabbitmq
      - ./enabled_plugins:/etc/rabbitmq/enabled_plugins
    ports: ["15672:15672"]
```

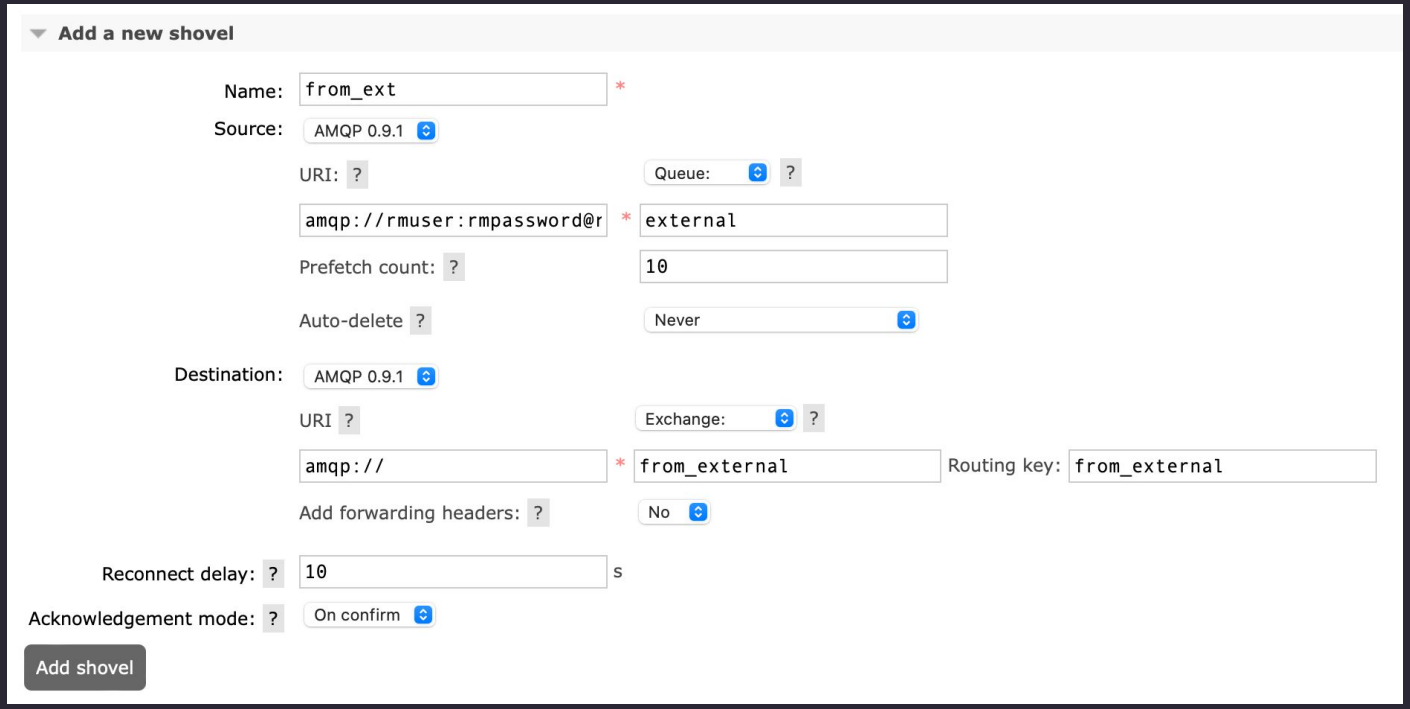
Shovel

```
[rabbitmq_federation,rabbitmq_federation_management,rabbitmq_management,rabbitmq_shovel,rabbitmq_
shovel_management].
```

Shovel


RabbitMQ
RabbitMQ 3.10.7
Erlang 25.0.4
Refreshed 2022-10-18 15:15:35
Refresh every 5 seconds
Virtual host All
Cluster rabbit@rabbitmq1
User rmuser
Log out
Overview
Connections
Channels
Exchanges
Queues
Admin
Dynamic Shovels
Shovels
... no shovels ...
Add a new shovel
Name:
Source:
AMQP 0.9.1
URI:
Queue:
amqp://
Prefetch count:
Auto-delete
Never
Destination:
AMQP 0.9.1
URI
Queue:
amqp://
Add forwarding headers:
No
Reconnect delay:
s
Acknowledgement mode:
On confirm
Users
Virtual Hosts
Feature Flags
Policies
Limits
Cluster
Federation Status
Federation Upstreams
Shovel Status
Shovel Management

Shovel


Add a new shovel
Name:
from_ext
Source:
AMQP 0.9.1
URI:
Queue:
amqp://rmuser:rmpassword@r
external
Prefetch count:
10
Auto-delete
Never
Destination:
AMQP 0.9.1
URI
Exchange:
amqp://
from_external
Routing key:
from_external
Add forwarding headers:
No
Reconnect delay:
10
s
Acknowledgement mode:
On confirm
Add shovel

Shovel


RabbitMQ
RabbitMQ 3.10.7
Erlang 25.0.4
Refreshed 2022-10-18 15:26:33
Refresh every 5 seconds
Virtual host All
Cluster rabbit@rabbitmq1
User rmuser
Log out
Overview
Connections
Channels
Exchanges
Queues
Admin
Shovel Status
Name
Node
State
Source
Destination
Last changed
Operations
from_ext
dynamic
rabbit@rabbitmq1
running
amqp091
amqp://rabbitmq-ext
external
queue
amqp091
amqp://
from_external : from_external
exchange
2022-10-18 11:20:14
Restart
Users
Virtual Hosts
Feature Flags
Policies
Limits
Cluster
Federation Status
Federation Upstreams
Shovel Status
Shovel Management

Shovel

Pagination

Page 1 of 1 - Filter: Regex ?

Overview					Messages	
Name	**Type**	Features	**Consumers**	**State**	**Ready**	**U**
external	classic	D Args	1	idle	0	

Shovel итоги

- **Работает в кластере** - дополнительная отказоустойчивость
- **Add forwarding headers** - медленно добавляет заголовки в сообщение
- **URI** - для vhost / - ставить слеш в конце не надо!
- **URI** - для локального кластера можно оставить amqp://

Демонстрация

Практическое задание

- Запустить **три инстанса RabbitMQ** с отдельными стейтами
- Настроить **балансировку на management** при помощи haproxy
- **Собрать кластер** из 3 инстансов RabbitMQ
- Создать классическую очередь
- **Настроить HA- полиси** для этой очереди
- Записать пачку сообщений в очередь
- Проверить **отказоустойчивость кластера**
- Настроить **shovel**

Конец

А кто слушал - молодец