Multi-Containers Orchestration with Live Migration and High-Availability for Microservices
Meet Our Presenters

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Containers - a New Degree of Freedom within Cloud

New concept of virtualization solution for cloud PaaS and IaaS due to containers’ increased density, isolation, elasticity, and rapid provisioning

**Containerization** provides the ability to
- Use lightweight packages instead of full VMs
- Move from single large monolithic apps to compositions of dozens of microservices within isolated containers
- Containerize different parts of an application
- Move parts of apps into different types of cloud infrastructure
- Simplify migration of enterprise applications between private, public and hybrid clouds
Containers inside Jelastic from 2011

• Pioneering a cloud platform which uses Parallels Virtuozzo Containers to deliver services

• **Production-ready solution for advanced containers orchestration with live migration and high-availability for microservices**

• Containers management functionality proven by companies worldwide during the last 4 years
Jelastic Cloud-in-a-Box – DevOps For Containers

**Unlimited PaaS**
Flexibility for Developers

Java, PHP, Ruby, Python, Node.js, .NET

**Container-Based IaaS**
Control for IT Operations

Linux, Windows

**Turnkey** Public, Private or Hybrid Cloud
## Languages and Middleware

<table>
<thead>
<tr>
<th>App Servers</th>
<th>SQL &amp; NoSQL DB</th>
<th>Tools for DevOps</th>
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<td>JBoss</td>
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<td>NGINX</td>
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<td>Tomcat</td>
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<td>Jetty</td>
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<td>Wildfly</td>
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<td>Apache</td>
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<td>HAPerxy</td>
<td>Memcached</td>
<td>BaaS</td>
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</table>

+ many other middleware stacks and applications via Docker templates
Multi-Containers Environments

Programing language selector

Load balancer

Application Servers

Change application server

Change language version

Cache

NoSQL

SQL

Build Node

Elastic VPS

Jelastic SSL
Docker Support

Over 15000 Docker images are available for installation from Docker Hub on top of Virtuozzo containers.
Docker Support

Enable or disable template with On/Off switcher

Application Servers
- jelastic/tomcat8:latest
  Vertical scaling per node
  Reserved cloudlets:
  - 16 cloudlets(s)
  - 2.00 GB, 3.20 GHz
  - 0.1344 credits per hour
  - Discount: 30%
- Scaling Limit:
  - up to 32 cloudlets(s)
  - up to 4.00 GB, 4.0 GHz
  - up to 0.2976 credits per...

Resources (cloudlets)
- Reserved cloudlets:
  - Now: 2
  - Discount: 15%
  - Scaling Limit:
    - up to 32 cloudlets(s)
  - Total Reserved Cloudlets: $15 per month
  - You're saving $3/month by using Reserved Cloudlets
- Total monthly cost:
  - $15* to $238*
  - Free of charge for the beta period

Public IPv4
- Configuration
  - jelastic/
  - jelastic/
  - Docker

Make additional container configurations
- (perform containers linking, customize environment variables, configure ports and set Docker run command arguments)

Environment name:
- docker-env
- jelastic.com

Switch between active slots with added templates
Add new image by clicking on any empty Docker slot or the blue plus button
**Docker on Top of Virtuozzo Containers in Jelastic**

<table>
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<th>Feature</th>
<th>Details</th>
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<td>Smart clustering for complex applications</td>
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<td>Automatic vertical and horizontal scaling</td>
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<td>Deploy across multiple containers</td>
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<td>High availability and smart container distribution by load mark</td>
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<tr>
<td>Bind custom scripts on cloud events</td>
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<tr>
<td>Link support between containers on multiple hardware nodes</td>
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<td>Built-in toolset for managing the container resources</td>
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<td>Advanced app packaging standard</td>
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<td>Docker Registry Hub</td>
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<td>Built-in pull functionality</td>
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<td>CRIU support (live migration)</td>
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<tr>
<td>Advanced network isolation with own host-routed network interfaces for each container</td>
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<tr>
<td>Ability to manage disk space size and data storage file in each container separately</td>
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<tr>
<td>Ability to limit disk I/O usage per container</td>
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<tr>
<td>Ability to set fair memory limits</td>
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</table>
Microservices are Gaining Momentum

The container system in the Jelastic Cloud goes hand in hand with microservice architecture pattern

- Building applications as suites of services
- App services can be scaled by distributing across containers, replicating as needed
- Each app part can be configured and monitored separately
- No need to rebuild and redeploy the entire application if any changes are required
- Services of one app can be written in different programming languages
- Application can be managed by different teams, when each is responsible only for a certain part
Simple Monolithic Application

Fear of change

- Need to redeploy everything to change one component
- Increase risk of failure
- Container overload
- Mutual dependencies require much coordination and slow down development
- Long QA cycles lead to less often updates
Decomposing Complex App into Microservices

Flexibility and scalability

• Modular, polyglot, and scalable applications
• Services developed, deployed and scaled independently
Publishing Company

2nd environment with MySQL server runs more than 31500 organisation databases
Web application
- NGINX is used for load balancing, cache and web front.
- Jetty 9 with Java 8
- Database – Neo4j
- Search server – Apache Solr

Batch application
- Standalone Java 8 application
- PostgreSQL (source database)
- Redis (cache)
- Neo4j (target database)

Batch node is used for importing new data once per day. 126 cloudlets (this is typically 0 cloudlets and then during import it scales to 110 cloudlets) – scale up

Web nodes can be scaled up to 30 cloudlets but never reach more than 20 - scale out
Research and Publishing Software Company

- **Apache cluster**
  Several Apache nodes running PHP 5.5 and NGINX load balancer

- **Set of replicated NFS servers built on VDS nodes**
  mounted to the Apache cluster for unified storage across each node

- **PDF server**
  offloaded a proprietary application for generating print production ready PDF’s onto its own VDS node to remove its processor load from application servers

- **PostgreSQL**
Gambling Company

**Game server**
- MySQL
- Tomcat

**Session server**
- NGINX
- Tomcat

**Internal services server**
- CentOS
- Tomcat
FEATURES
Automatic Vertical Scaling

During the load spikes, Jelastic allocates more resources for app and takes them back, when they are no longer needed.
Automatic Horizontal Scaling

Automatic horizontal application scaling based on defined triggers and load changes.
Smart Distribution of Containers

Automatically **distribute containers** installed in one environment evenly on different hardware nodes (physical servers) with the help of anti-affinity groups eliminating any risk of application downtime.
Live Migration

Migrate containers with application from one physical server to the other with zero downtime

- increases operational efficiency
- provides better load balancing and data center utilization
- scale within a server without downtime
- allows moving customers to more powerful nodes without service interruption
Flexibility for Development

**SSH Access**

- Interactive SSH Gateway
- Ability to travel across environments and containers, without unnecessary extra authentication
- Direct connect to any container with support of SFTP, SCP, FISH, Puppet, Chef, Capistrano

**Open API**

- Create complex workflows and app management
- Simply integrate existing solutions to the cloud
- Easily provision and de-provision the required amount of VMs for specific workloads
App Development with Large Teams

Each microservice can be deployed or updated with local changes independently of other services making continuous deployment in large teams feasible.

Jelastic provides the needed tools and features for easy collaboration while working on separate parts of one application:

- Use and configure shared environments
- Each environment can be managed by a separate dev team
- Environments can be easily cloned and imported/exported
- Work with the same VCS repository
- Public API
- Switching domain names and traffic between stage and production
- One consolidated billing account
Out-of-the-Box Solutions

Licenses Included
- Parallels Cloud Server
- Parallels Containers for Windows
- Parallels Cloud Storage

Support
- 24/7
- 8/5
- Training sessions and certification

Monitoring
- Set pre-defined or custom triggers and alerts
- Track statistics and logs
- Integrated Zabbix, DripStat, NewRelic, AppDynamics
- Built-in business analysis tools
Marketplace

• **250+** applications for one-click installation
• **15000+** Docker templates
• Integrated marketplace into intuitive UI
• Ability to pack the most demanded apps
• Easy way to add new/custom apps to marketplace
High Level Architecture

TOOLS
- Dev Dashboard
- Ops Panel
- Marketplace

ORCHESTRATOR
- Jelastic Smart Management

CONTAINERS
- Parallels® Virtuozzo
- or
- docker

INFRASTRUCTURE
- Bare Metal Hardware
- or
- Public IaaS
BUSINESS
OPPORTUNITIES
Jelastic Cloud Business Benefits

• **New markets and services**
  – Jelastic affordability and simplicity opens up SME and department markets
  – Managed cloud services on-premise
  – Upsell of additional software, tools and services

• **Increased margins and decreased TCO**
  – Retain higher margins compared to alternatives
  – Accelerate your own software development and delivery

• **Simplicity**
  – Lower partner on-boarding investment
  – Deployment on Bare Metal & any IaaS

• **Exclusivity**
  – Don’t lose more deals to competitors
  – White-labeling
Target Customers

** Enterprises
- Systems integrators
- Industrial companies
- Telecommunications
- Trading companies
- Shipping and transportation

** Developers and DevOps
- ISVs
- Outsourcing teams
- Software development agencies
- Gambling
- IT consulting services

** Governmental Organizations
- Educational institutions
- Health-care companies
- Financial IT departments
- Protection departments
- Agriculture sphere
Partner Program Benefits

- **Practical Sales Support**
  Experienced sales support to help profile, present to, and close new customers

- **Marketing Support**
  Provision of co-branded material for seminars, shows, open days etc.

- **Technical Pre-sales Support**
  Access to top specialists to answer integration and environment questions

- **Jelastic Demo Cluster**
  Free prospect access to demo cluster to test their environments
Proven Technology

30+ hosting service providers
10+ private cloud customers
15+ reselling partners
150,000+ developers around 25+ countries
Contact us for more information

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www.jelastic.com