World of Tanks
Linux and Open Source Inside

Maksim Melnikau

I'm

- developer in Wargaming (Belarus, Minsk)
  - ~~Order of War~~
  - ~~Order of War: Challenge~~
  - World of Tanks
- Linux Mobile hobbyist
  - ~~Openmoko~~
  - systemd
  - telepathy
  - Gentoo

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World of Tanks

- mmorpg
- fps about tanks
- 15x15 pvp

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World of Tanks Today

- 800k concurrent users in peak
- 8M messages per second
- 500 servers for game and web
- 60M game portal visits per month
- 5 PB (petabytes) for game installs and updates per month

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Cheaters

- many players want to cheat
- cheaters make other players unhappy
- cheaters xenophobia

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Scaleability

- better product — more users
- more users — more servers
- more servers — bigger synchronization problem

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Single Datacenter Issues

- latency
- availability
- single point of failure

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Big Data

- more users — more data
- more data — bigger disks
- suddenly, new storage solution required

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Rapid Growth

- simple solution — faster time to market
- great success — simple solutions completely unusable
- rewriting everything on-the-fly
- business changes every day


WORLD OF TANKS

Nobody Will Help You

- no time to educate people
- no time to wait 3rd party support
- no time to write good proper solutions

Full Control

- software
- data
- team
- hardware

Linux and Open Source Software

- ready to use components
- good documentation
- customize software when required
- hire people with required skills

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World of Tanks Architecture

- game client — thin client, player
- server — world simulation
- cluster — thousands of process working as one server
- step-game world, with very small steps

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Development

- regular Python
- GC disabled
- some parts rewritten on C++
- message-based RPC
- UDP-based reliable internal protocol

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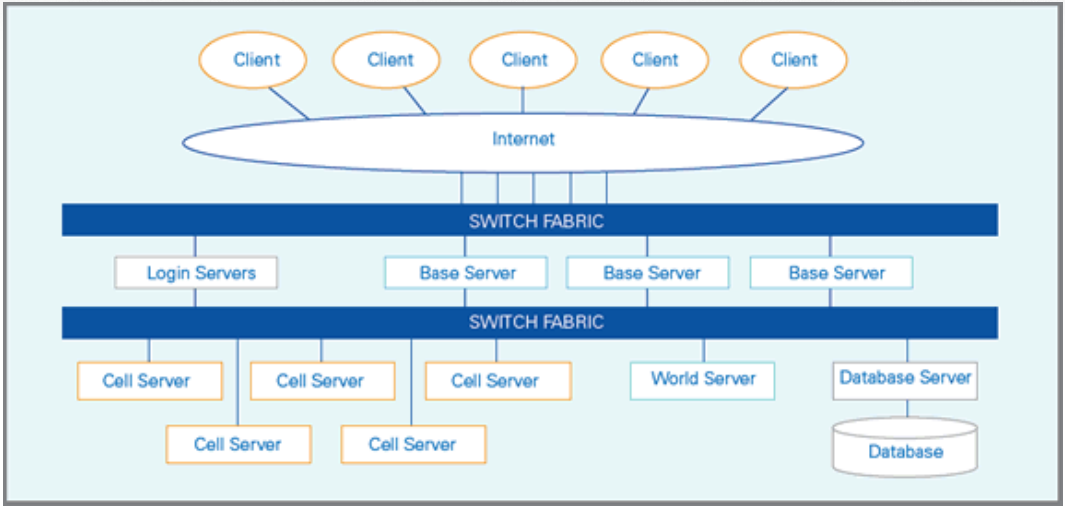
Cluster


Client
Client
Client
Client
Client
Internet
SWITCH FABRIC
Login Servers
Base Server
Base Server
Base Server
SWITCH FABRIC
Cell Server
Cell Server
Cell Server
World Server
Database Server
Cell Server
Cell Server
Database

Multi Cluster

- scaleability
- geo distributed
- availability
- independence

Production

1. 500 servers
2. 8k cpu cores
3. 32 TB RAM
4. Linux

MySQL

- database size: 300 GB
- 384 GB RAM
- Percona 5.5 (buffer pool warming — 1GBps)
- 40k selects, 1k inserts, 1k updates per second
- 24 HDD $*$ 600 GB $*$ 0.5 $=$ 6 TB

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Client

1. regular Python
2. HUD - ActionScript, Scaleform
3. 3D graphics - C++

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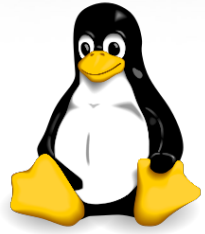
Web Tasks

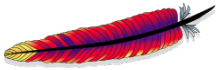
- registrations
- news
- docs
- media
- payment form
- receiving payments

- update distribution
- account management
- account profile
- statistics
- ratings
- ...

LNAMPMR



NGINX



MySQL®

python™

RabbitMQ
Open Source Enterprise Messaging

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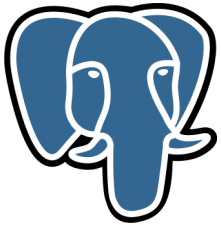
Other



Keys to Success

- Linux on server
- relaying on Open Source
- fast and easy development
- having full control on everything
- don't afraid of different software stacks

Thank You. Questions

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