

### **Cloud platforms**

T-110.5130 Mobile Systems Programming



- 1. Motivation
- 2. Different types of cloud platforms
- 3. Popular cloud services
- 4. Open-source cloud
- 5. Cloud on this course
- 6. Some useful tools



#### **Motivation**

- Your mobile app might need backend
- Focus is on mobile end, so time used working on backend should be minimized
- Cloud platforms are mostly easy to use
- Get your back-end running in hours
- No need to get own servers etc.
- High scalability when your app grows



# 2. Types of cloud platforms



### Software-as-a-Service (Saas)

- (Web) Application offered as service
- You can not really customize anything
- Easy to use
- Examples: Gmail, Google Drive, Office 365
- Probably not useful model on this course (as a backend for your app)



### Platform-as-a-Service (PaaS)

- Software building platform offered as a service
- Build you app using tools offered by platform
- Platform automates deploying and scaling
- Possible vendor lock-in
- More freedom than with SaaS
- Examples: Google App Engine, Heroku
- Probably useful type on this course



### Infrastructure-as-a-Service (laaS)

- Service offers infrastructure
- You install everything you need
- Virtual machines
- Works for almost any kind of application
- More freedom than with PaaS
- Examples: Amazon AWS, Microsoft Azure, Google Compute Engine, OpenStack
- Useful on this course



### 3. Popular cloud services



### Heroku (PaaS)

- Supports multiple different programming languages
- Automatic scaling for app
- Database as a service
- You can get started for free



### Google App Engine (PaaS)

- Supports Python, Java, PHP and GO
- Cloud SQL database
- You can get started for free



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### Amazon AWS (laaS)

- Virtual machines, storage, database, dns, cdn...
- You configure everything yourself
- Scalability (mostly) designed by you
- Multiple locations around the world
- Free tier for 12 months after signup



### **Google Compute Engine (laaS)**

- Virtual machines, storage, load balancing
- Scalability (mostly) designed by you
- Multiple locations around the world
- Free tier to get you started



### Microsoft Azure (PaaS & laaS)

- .NET, Java, PHP, Node.js, Python, virtual machines, storage, database, also other Microsoft stuff
- Auto scaling for managed apps
- Free tier to get you started



### 4. Open-source cloud



### **Open-source cloud systems**

- Run cloud applications on your own hardware
- Easily manage virtual machines, networking, storage
- Apache Cloudstack
- OpenNebula
- Eucalyptus
- OpenStack



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### **DCS OpenStack**

- We can provide credentials for you
- Offers more free resources than commercial systems
- However, strict firewall, so tunneling (ssh) is required
- If your backend needs to process data, this might be for you
- Hybrid model?
  - Host app on public system, process data on our cloud



## 5. Cloud on this course



### What you can use?

- Any cloud service with free tier
  - Or any paid system if you are willing to pay it yourself
- If none of the free alternatives is not suitable for your group contact course staff
  - We can provide you with Amazon credits
- If you have own server, you can use it
- DCS OpenStack is available on request
  - Incoming connections have to be tunneled, might be difficult on mobile systems



### Help with back-end

- No dedicated support, but you can still ask me
  - I try to help if I can
- IRC: KimiA@IRCnet
- Email: <u>kimmo.ahokas@aalto.fi</u>
- Include course code in email header! (or in first message if using IRC)
- Try to include as much information as possible
  - Waht were you trying to do?
  - Complete error message with stack trace
  - Link to source code would be nice  $\odot$



## 6. Some useful tools



### Why bother with new tools?

- Good tools make your work easier
- Coding is easy, communication is not
- Working as a team requires good communication
- Need easy ways to share code, assign tasks to team members, update others on progress etc.



### **Version control**

- Store you code using some version control system
- Niksula GitLab: <u>https://git.niksula.hut.fi</u>
  - Hosted by school
  - Private repositories
  - You need Niksula account (you might have it already), easy to get
- GitHub: <u>https://github.com</u>
  - Popular choice
  - Paid private repositories
- BitBucket: <a href="https://bitbucket.org/">https://bitbucket.org/</a> (git + mercurial)
- Kiln: <u>https://www.fogcreek.com/kiln/</u> (git + mercurial)
- And many more...



### Task / issue tracking

- What to do, when to do it and who does it?
- Issue tracking feature built in GitLab, GitHub
  - Refer issues from from git commit messages
- Trello: <u>https://trello.com/</u>
  - General project management, works for coding as well
  - Canban style (or anything else, Trello is very easy to customize)
- And many more (hosted) services



### Messaging

- I bet you don't want to receive emails from your team daily!
  - Information gets lost, difficult to manage
- Facebook groups hide information, don't use those!
- Instant messaging
  - Google hangouts, IRC, Facebook messenger etc.
- Shameless add: Flowdock: <u>https://www.flowdock.com/</u>
  - Designed for software development teams
  - Unified inbox and team chat
  - Get information from git, trello, twitter, email, 10's more...
  - Free for students and teams with at most 5 members