

The top half of the slide features a blue background with abstract, flowing shapes. On the right side, the text "INTERNET FOR ALL" is written in white, uppercase letters. To the right of the text is a graphic of white, oval shapes arranged in a fan-like pattern, resembling a stylized sun or a network of connections.

INTERNET
FOR ALL

AWS at Telenor Digital

Internet Services for the next Billion

THE INTERNET OPPORTUNITY IN ASIA

1.1 billion

people in our footprint

145 million

are internet users

50% under 30 yrs



Norway: ~30% under 30 yrs

Mobile penetration



Thailand
120%



Myanmar
11%

Gni per capita ppp



India
USD 3,910



Malaysia
USD 16,290



Bangkok the
FB capital of
the world:
+10 mn users



Dhaka fastest
growing city on
Facebook

ONLY 15% OF PAKISTANIS HAVE
ACCESS TO REGULAR BANKING SERVICES

Internet
FOR ALL



Online marketplaces like mudah.com.my
are going mobile



Mobile health-care bring qualified doctors to
rural Bangladesh - online

Telenor Digital “Digital Startup incubator” inside Telenor



AWS at Telenor Digital



- Using AWS for production services since 2011
- Physical servers only when we need to control hardware
- 10+ services, 250K EC2 instance-hours/month in Ireland and Singapore regions
 - All engineers can have personal AWS accounts for experimentation
- Development services run in AWS: Jenkins, Gerrit, JIRA etc

- Use a wide range of AWS capabilities – AWS as IaaS and PaaS
 - EC2, S3, RDS
 - SQS, SNS
 - CloudFormation
 - ELB, Auto-scaling groups
 - VPC with VPN tunnels
 - Redundancy across availability zones and regions
 - Route 53 (DNS, registrar)
 - CloudWatch for monitoring



Case: Comoyo View



- 2011: Comoyo View team starts building physical servers for transcoding
 - Rationale: benefit from high-powered GPU
 - Also some initial legal concerns
- Content deal results in access to 1000's of movies
- Need a lot of compute power at peak – very little otherwise
- Learned that optimal results require constant tweaking of parameters
 - Jobs often had to re-run, adding a lot of unplanned capacity requirements
- Task moved to AWS to be able to scale
- What we learned: ability and simplicity of elastic scaling of capacity by far outweighs local optimization potential



Case: Grouper



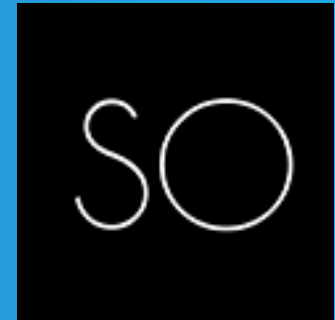
- “Grouper helps group organizers and participants to communicate and coordinate effectively.”
- Started in March 2014 with 6 devs + PM
- Beta in May 2014
- Project shut down in December 2014
- Service shut down in February 2015
- **Cost for buying hardware: 0 NOKs**
- **Opportunity cost for using staff to build basic infrastructure: none**
- **Time from tested software packages to service in production: 0**



Case: SOBAZAAR



- “Follow your friends, fashionistas and favorite brands. Love and share your favorite looks - and shop the newest fashion pieces at any time at your ultimate fashion destination!”
- Brought into TD in October 2013 with 6 devs + PM
- Continuous improvements to system in production
- Launched in September 2014 – 30.000 users in 3 months
- Move to independent company announced in December 2014 (co-owned by Schibsted and Telenor)
- **No moving of physical servers – just change accounts**
- **Very little risk, zero downtime**

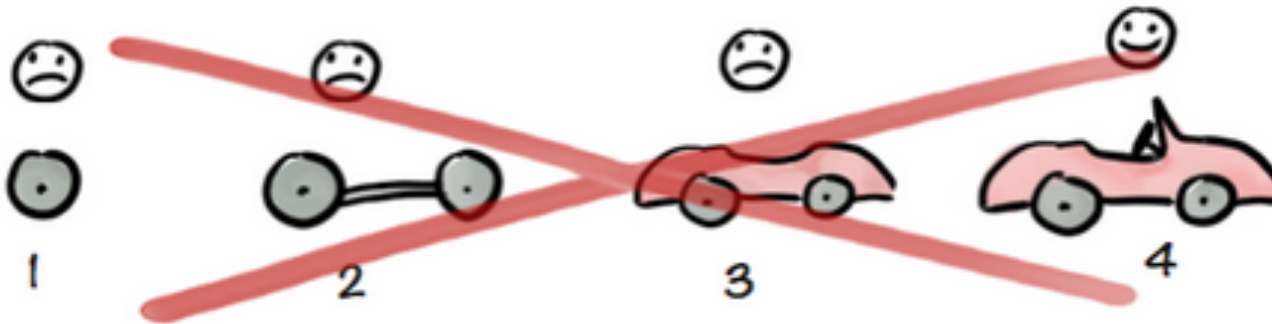


Minimal Viable Product in the Cloud

Fail fast and with little waste!



Not like this....



Like this!

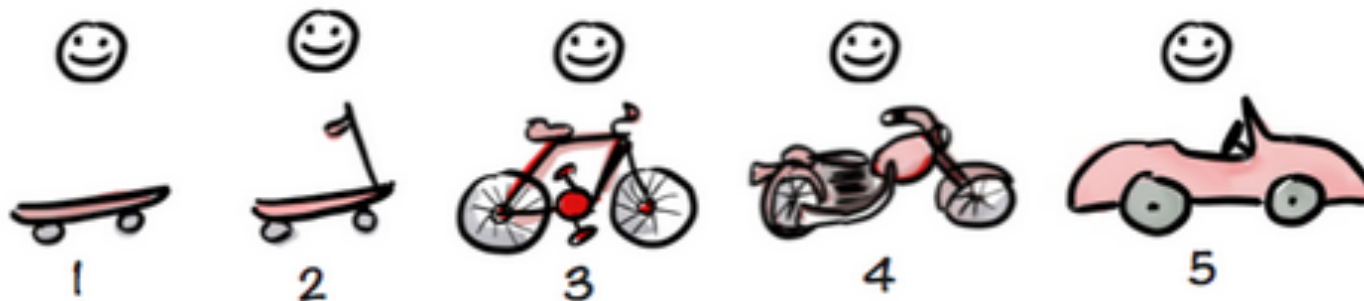


Image source: <http://www.chrisyin.com/images/spotify-mvp.png>

Telenor Connect – Global Backend Services

High demands on compliance!



- ID provider
 - Authentication, account and rights management
 - Highly sensitive data – storage of Personal Identifiable Information
 - Performance – latency is critical aspect of UX
- Payment solutions
 - Billing gateway towards credit card, operator billing etc
 - Store credit card details – need to be PCI compliant
- Security in a public cloud
 - Would we be better in providing basic infrastructure security?
 - Focus energy and competence on building secure services!

The Cloud: A catalyst for better software



- Faster time to market – self-service in teams, rich capabilities
- Reduced variability and increased repeatability – infrastructure as code
- Continuous Delivery – deployment automation up from host provisioning
- Accountability in teams – cost transparency
- Validation and testing – A/B and Canary testing/phased roll-out
- Robustness – fewer implicit assumptions, states are made explicit
- Anti-fragility – deliberately break assumptions to encourage resilience

But this doesn't mean No-Ops



- Administration and operations still requires expertise
 - System design – building resilient, scalable systems
 - System and network administration – account and access management
 - System operation – monitoring, alerting

These best practices can often be shared across teams
Standardization makes it easier to automate and scale

Thank you!

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