Frank Karlitschek

- Studied Computer Science in Tübingen
- Involved in open source since over 20 years
- Founded ownCloud
- Founded Nextcloud
Agenda

• The current Nextcloud/ownCloud architecture
• Shortcomings
• A new approach
• Next steps
The current architecture

- Standard http web application architecture
- Inspired by past experience
- Off the shelf scaling (Load balancers, Storage, DB, SSL/TLS)
- Scales from very small to very big. This is unique
Ongoing improvements of the architecture

- Object store integration (less logic in storage and more in application)
- Extended attributes (more logic in storage and less in application)
- Experiment with distribution over different sites
  - Difficult to keep state of storage, database, auth, logs, ... in sync.
- Ongoing performance improvements for example in Nextcloud 11
Nextcloud 11

- Released last December
- Monitoring interface
- Security (Hardware 2 factor, Kerberos, Brute Force protection, ..)
- WebRTC video/voice calling
- Fulltext search
- New AppStore/Market
- Improved federation and personalized public links
- Improved upgrades with new upgrade script
- Major improvement in performance and scalability
Nextcloud 11 performance

• Significant improvements in sharing and file handling code
Nextcloud 11 performance

- Significant improvements in sharing and file handling code
Nextcloud 11 performance

- Significant improvements in sharing and file handling code
Nextcloud 11 performance

- Significant improvements in sharing and file handling code
Nextcloud 11 performance

- Previews are shared now
- Reduced the storage needs
- Reduces the load to generate previews
- Background generation
Still major architecture limitations
1. Limitation

Scalability

Doesn’t work for instances with 10s of millions of users or more
2. Limitation

Cost

60% to 80% of cost goes into storage
3. Limitation

Distribution

No distribution over several hosting centers/continents possible
Current architecture
Nextcloud Global Scale
• This is an alternative and not a replacement
• Soft transition possible if wanted
• 100% open source (As everything we do)
• Kills the shared components
• Solved the 3 limitations
Current architecture
Nodes

- Commodity hardware
- Node size between 1-2 servers up to bigger instances
- Located in different hosting center / continents / offices
- Sharing is done with federated shares
- Federated group shares
- Metadata sharing like activities and comments
- Staged upgrades are possible
- Node deployment and management tools
Lookup Server(s)

- Super fast
- Stores the location of every user
- Exists since Nextcloud 11
- Support multi master and master-slave replication
Global Site Selector(s)

- Authenticates User
- Queries Lookup Servers
- Redirects to Node
- Implemented as Nextcloud App
Balancer

- Monitors Storage, Load, Network, Location, SLA, ...
- Migrates users between Nodes during runtime
- Migration of public shares
- Node lifetime management
- User Backup if wanted
- Respects data locality laws
Nextcloud GS

• This is the first time we talk about this in public
• Preview for research community
• Official released and production ready with Nextcloud 12 in 3-4 month
• Research done in collaboration with DeiC and TU-Berlin

• Big 10s of millions of users Nextcloud customer
• More information about federation in Björns talk
Next steps

• Everyone is invited to participate in testing or a pilot
• Feedback / Contribute
• 100% open source
• No contributor agreement needed. Never will be proprietary
Questions?