Developers and Architects

Strategies 2018

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Agenda

Idea: Talk about technology

- Application building blocks
- Services
- Microservices
- Data persistence
- Security
- IoT
- User Interfaces
- Programming Languages
- Mobile
- Cloud

Application Building Blocks

- What is an "application" made of?
- Terminology check:
  - Client application
  - Server application
  - Web application
  - Application system
  - Enterprise application

Building Blocks

Terminology: Client Application

- Kann auf einem "Client" laufen
  - Client im Gegensatz zum Server
- Kann im Client/Server-Zusammenhang verstanden sein
- Thin/Fat-Clients
  - Einfaches Konzept aus architektureller Sicht
  - Sehr einfaches Deployment einer einzelnen Installation
  - Statische, planbare Anforderungen an Kommunikationsinfrastruktur

Terminology: Server Application

- Laeuft wahrscheinlich auf einem Server
  - Kann auch ein Client sein...
- Stellt Dienste bereit
  - ...oder automatisierte Funktionen

Terminology: Web Application

- Traditionell: Server-Anwendung, die ueber HTTP Daten verfuegbar macht
- Modern: Basiert auf HTML/JS
  - Serverkomponente noch immer wichtig
  - Gegenbeispiel: Wenn ein Spiel durch den AppStore auf mein iPhone gelangt und nie mit einem Server redet, ist es keine Web-Anwendung, auch wenn es in HTML/JS geschrieben ist

Terminology: Application System

- Die meisten "Anwendungen" haben heutzutage mehrere Komponenten und sind eigentlich Anwendungssysteme

Terminology: Enterprise Application

- Enterprise-Anwendungen skalieren fuer sehr grosse Organisationen und Datenvolumen
- Architekturell nicht unbedingt anders als andere Anwendungen

Services

- Part of most architectural concepts
- SOA?
- Web Services
- "Real-time web?" SignalR? socket.io?

Services — SOA

Remember the four tenets Don Box got excited about?

- Boundaries are explicit
- Services are autonomous
- Services share schema and contract, not class
- Service compatibility is determined based on policy

SOA *resulted* in a very formal understanding of service architecture, which is fortunately not shared by too many architects today.

Web Services

- ASMX — WSE — WCF — WSDL — SOAP — Microsoft's world of enormous complexity intended to solve a very simple problem
- RESTful services: the most complicated part is the name
  - URLs and HTTP methods
  - JSON, XML and possibly other data formats, using content negotiation

Services — Real-time Web

- WebSockets and their various ancestors
- Bi-directional communication

Reasoning against real-time web techniques:

- In manchen Faellen braucht man "nur" AJAX
  - Client definiert den Zeitpunkt
  - Kann automatisch von Caching profitieren
- Bedenken Sie die "Kosten"
- Codestruktur aehnlich State Machine

Microservices

How big is a microservice? It depends.

- Do one "thing" well. What's a "thing"? It depends.
- Two-pizza team
- Throwawayable
- Focus on boundaries and business context, not on lines of code

Microservices — Communication

- Direct communication between services
- Message Queues
- Service Bus (ESB)

Microservices — Composition

- Manual composition? Painful.
- Docker containers
- docker-compose
- Cloud container services (ecs-cli, Azure Docker VM extension)
  - Also support composition

Microservices — Serverless

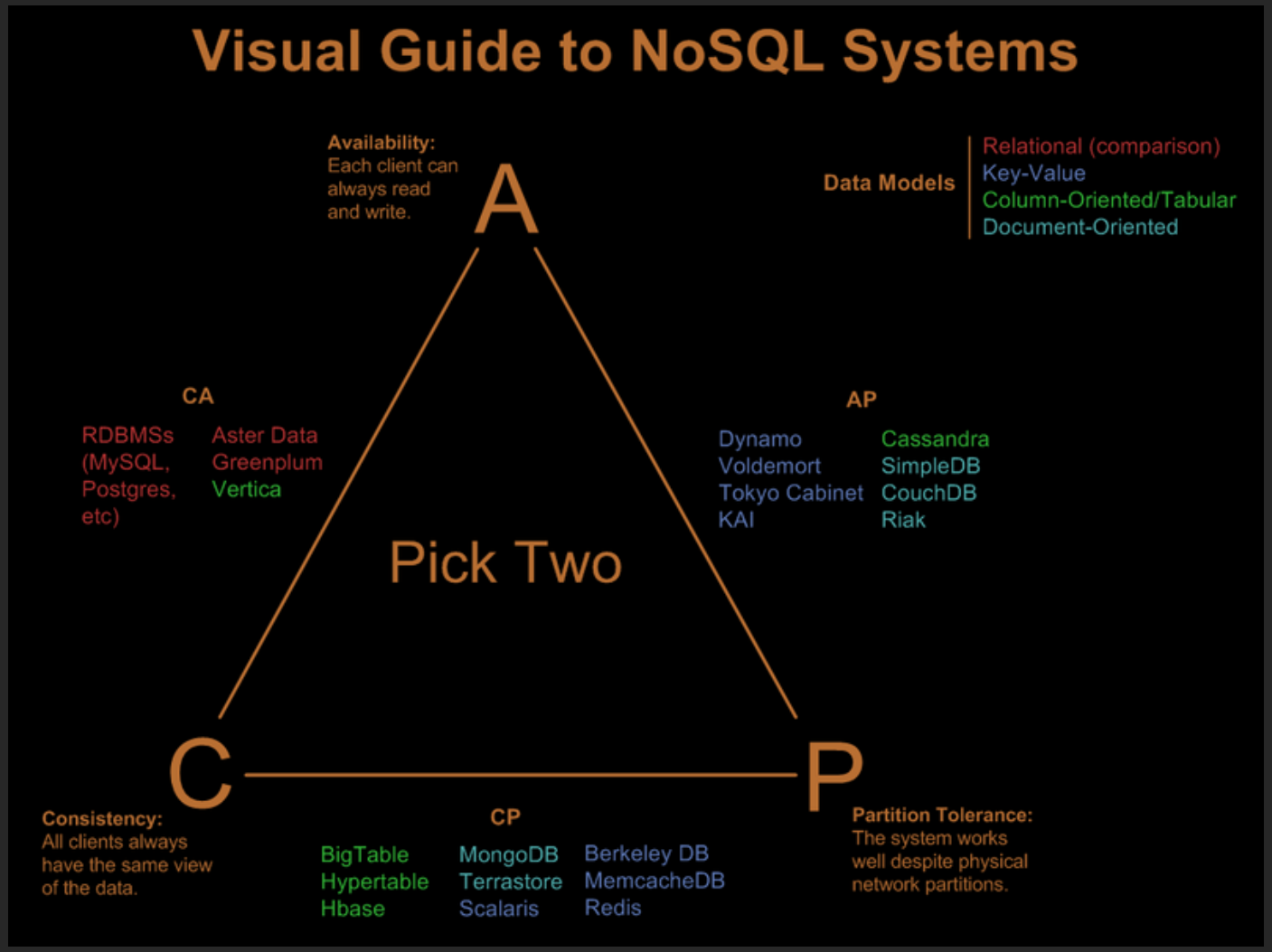
- Function level composition: AWS Lambda, Azure Functions, Google Cloud Functions, ...
  - Integration with cloud infrastructure for triggering and output generation
- Event driven, scaleable systems with minimal infrastructure management requirements
- Pay as you go
- Lock-in effect
- Debugging, Testing...

Microservices — Reasoning

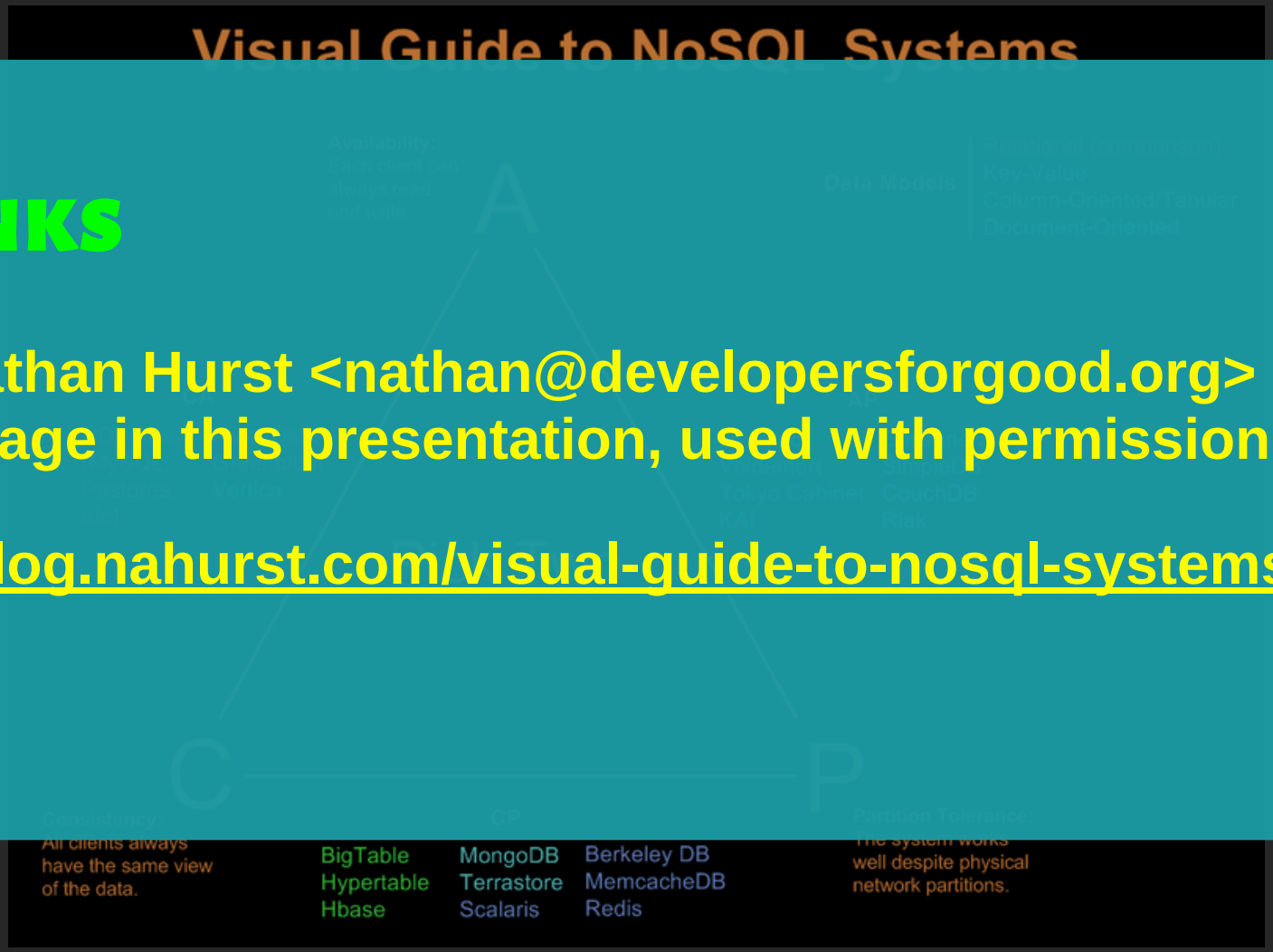
Data Persistence

- Relational databases
- NoSQL options
  - Key/value and column family stores
  - Document
  - Data analytics (e.g. MapReduce)

Data Persistence — NoSQL



Data Persistence — NoSQL



Thanks

... to Nathan Hurst <nathan@developersforgood.org> for the only image in this presentation, used with permission.

http://blog.nahurst.com/visual-guide-to-nosql-systems

Reasoning NoSQL vs RDBMS:

- Sicherstellen, dass von den Ideen der relationalen Datenhaltung profitiert wird
- NoSQL sehr vielfaeltig

Data Persistence — ORM

- Choice of frameworks
- Top Down or Bottom Up?
- DB Independence

Data Persistence — CQRS

Command/Query Responsibility Segregation

- Separate query and command models
- Conflicts with ORM?
- Event Sourcing
  - Eventual consistency

Reasoning CQRS and Event Sourcing:

User Interfaces

- Platforms
  - Native: WinForms, XAML
  - HTML
  - Electron

Reasoning for native UI platforms:

UI Application Patterns

- MVVM
- Flux

HTML UI — Where to Render

- Traditional web-server based rendering?

Reasoning:

Programming Languages

- .NET: C#, VB.NET, F#, others?
- JavaScript: Native, TypeScript, CoffeeScript, LiveScript, others?

Mobile

- Mobile support as a conceptual module
- Strategic platform?

"Native" Mobile

- iOS SDK
- Android SDK
- Windows Phone?

Reasoning:

Mobile .NET

- Xamarin
  - Native
  - Forms

Reasoning:

Mobile — HTML/Hybrid

- HTML (5), JavaScript, CSS
- PhoneGap/Cordova, CrossWalk, nw.js, ...
- Cross-platform

Reasoning:

Cloud

- Deployment option
  - Related: Docker?
- Managed infrastructure

Cloud functionality

- Supplied services, vertical features
- Base platform functionality
  - Dynamic scalability
  - SLA
- Serverless computing

Cloud — Legal Considerations

- Locations
- Industry/governmental requirements

Cloud Options

- Azure, Amazon Web Services (PaaS, IaaS)
- PaaS: Google (also some IaaS now), Heroku, others
- SaaS: Office 365, Azure/AWS Websites, ...

Cloud Reasoning

- For/against cloud:
- For/against specific platforms, IaaS, PaaS:

Open Source

- Everybody does it, right?
- Give and take...

Reasoning:

Sources

- This presentation:
  - https://oliversturm.github.io/developers-and-architects/basta-spring-2018
  - PDF download: https://oliversturm.github.io/developers-and-architects/basta-spring-2018/slides.pdf

Thank You

Please feel free to contact me about the content anytime.

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