

4. Technologies

4.1 Programming Languages & Frameworks

- **4.1.1 Programming Languages**

- Assembler (IBM)
- C / C++
- C#
- COBOL
- Go
- HTML5
- Java
- JavaScript
- Kotlin
- Python
- Scala
- TypeScript

- **4.1.2 Backend Frameworks**

- .NET Framework
- .NET 6 and later
- Spring Boot
- Thymeleaf
- JEE (Java Enterprise Edition)
- ASP.NET MVC
- ASP.NET Razor Pages
- Angular Universal
- DATEV Framework Library
- GraalVM

- **4.1.3 Frontend Frameworks**

- Angular
- DACKL
- Tailwind CSS
- WebAssembly

- WinForms
 - WPF
 - **4.1.4 AI Frameworks**
 - Apache Spark
 - LangChain
 - PyTorch
 - PyTorch Serving
 - Scikit-Learn
 - TensorFlow
 - TensorFlow Serving
 - **4.1.5 Authentication & Authorization**
 - DCAL
 - rvo-spring-boot-starter
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4.2 Platforms

- **4.2.1 Development and Operational Environments**
 - CaaS (Container as a Service)
 - GPUaaS (GPU as a Service)
 - PaaS (Platform as a Service)
 - **4.2.2 Public Cloud Hyperscaler**
(No entries listed)
 - **4.2.3 Application Servers**
 - IBM CICS
 - Internet Information Server (IIS)
 - Node.js
 - Open Liberty (PaaS)
 - IBM WebSphere Application Server
 - **4.2.4 Orchestration Platform for Data Products**
(No entries listed)
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4.3 Data Storage

- **4.3.1 Relational Data Storage**

- IBM DB2
 - MS SQL Server
 - PostgreSQL
 - **4.3.2 Document-Oriented Data Storage**
 - MongoDB
 - VSAM (IBM)
 - **4.3.3 Caching**
 - Redis Community
 - **4.3.4 S3 Object Storage**
 - **4.3.5 Data Platform**
 - DataHub
 - **4.3.6 Active Directory**
 - DirX Directory
 - **4.3.7 Search**
 - OpenSearch
 - **4.3.8 RDF Stores / Triplestores**
 - **4.3.9 Vector-Based Data Storage**
 - **4.3.10 Graph Database**
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4.4 Communication

- **4.4.1 Messaging & Streaming**
 - IBM MQ
 - Kafka
 - RabbitMQ
- **4.4.2 API Technologies and Server Push**
 - GraphQL APIs
 - gRPC APIs
 - HTTP & RESTful APIs
 - Server Push – Server Sent Events
 - Server Push – Web Push
 - Server Push – WebSockets

- SOAP
 - Webhooks
 - **4.4.3 Gateways**
 - API Gateway
 - CTG – IBM CICS Transaction Gateway
 - **4.4.4 DATEV Communication with Data Centers**
 - Data Center Communication as a Service
 - Data Center REST Web Service Communication
 - Data Center SOAP Web Service Communication
 - **4.4.5 Identity Management**
 - Keycloak
 - Entra ID
 - **4.4.6 Access Management**
(No entries listed)
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4.5 Development Tools

- **4.5.1 Monitoring & Observability**
 - ELK Stack
 - OpenTelemetry
 - Icinga
 - ProAgent
- **4.5.3 AI Tools**
 - Jupyter (Notebook and Lab)
 - Label Studio
 - Weights & Biases
- **4.5.4 Frontend Tools**
 - Partytown
- **4.5.5 Automation**
 - Terraform
- **4.5.7 Migration**
 - Liquibase

- **4.5.8 Development Tools**
 - CoPilot
 - JetBrains MPS
 - Testcontainers Cloud
 - **4.5.9 Semantic Knowledge Modeling**
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4.6 Security

- **4.6.1 Credentials and Secrets Management**
 - Vault
- **4.6.2 Security Tools**
 - WAF
 - COTS SAST Solution
 - COTS DAST Solution
 - Virus Scanning Service