TensorFlow Architektur

Software Architektur

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1 TensorFlow-Architektur

Was ist TensorFlow

–TensorFlow™ is an open source library for developing machine learning applications. These applications are implemented using graphs to organize the flow of operations and tensors for representing the data. It offers an application programming interface (API) in Python, as well as a lower level set of functions implemented using C++. It provides a set of features to enable faster prototyping and implementation of machine learning models and applications for highly heterogeneous computing platforms.

Stakeholders

- Forscher, Studenten, Wissenschaftler
- Architekten und Software Engineure
- Entwickler
- Hardware Hersteller

Anforderungen (Funktionale / Nicht-Funktionale)

- ML und DL Funktionalitäten: Schnelle Rechenoperationen, Matrizen, Lineare Algebra und Statistik
- Flexibilität: Forschung, Prototypen und Produktion
  –TensorFlow™ allows industrial researchers a faster product prototyping. It also provides academic researchers with a development framework and a community to discuss and support novel applications.
  –Provides tools to assemble graphs for expressing diverse machine learning models. New operations can be written in Python and low-level data operators are implemented using in C++.
- Performance: maximale Effizienz und schnelle Berechnungen.
- Portabilität
  –Runs on CPUs, GPUs, desktop, server, or mobile computing platforms. That make it very suitable in several fields of application, for instance medical, finance, consumer electronic, etc.

Anforderungsanalyse

Faktor Index	Beschreibung	Flexibilität Erweiterbarkeit	Einfluss
O1	Firmen	Flexibel/Variabel	Einfluss auf Architektur

+——————+——————+——————|——————————-+
| Faktor-Index | Beschreibung | Flexibilität | Einfluss |
+——————+——————+——————|——————————-+
| O1 | … | Flexibel | Einfluss auf die Architektur |
+——————+——————+——————|——————————-+
| T1 | … | Fest | … |
+——————+——————+——————|——————————-+
| P1 | … | Variabel | … |
+——————+——————+——————|——————————-+

Architekturentwurf

Kontext-Sicht

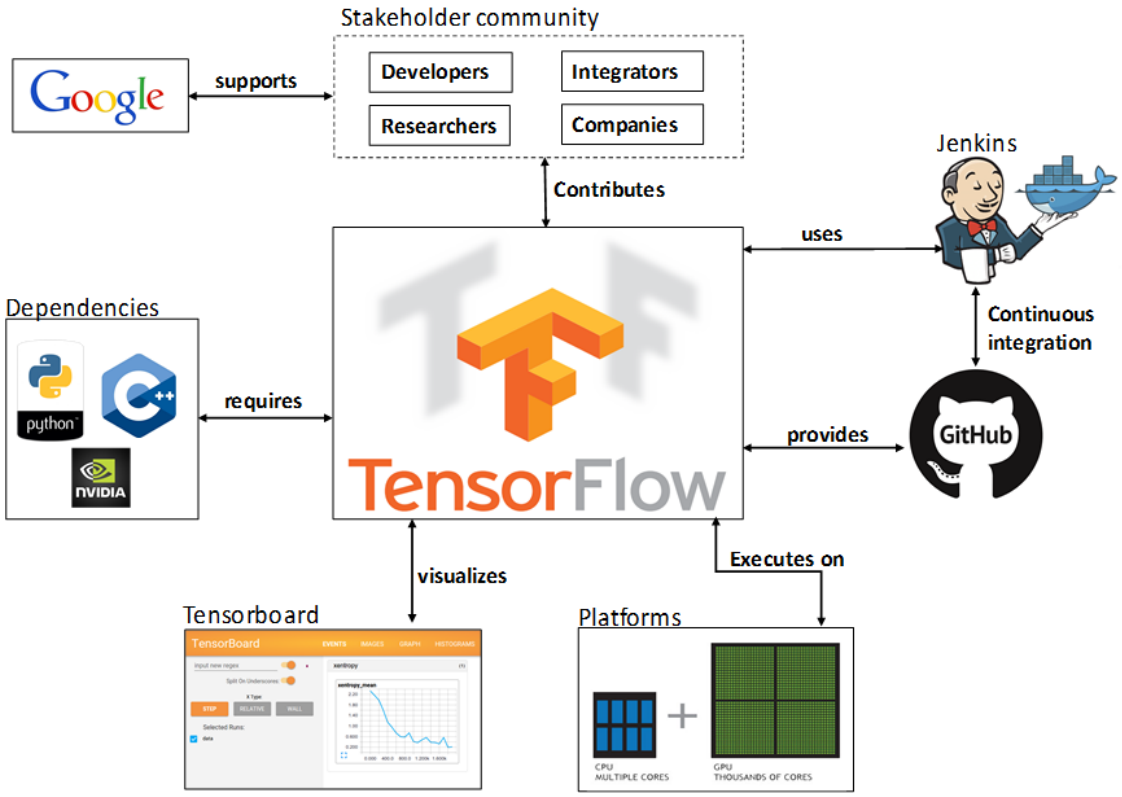

Abbildung 1.1: Dependencies

Source-Code-Hierarchie

–TensorFlow™ 's root directory at GitHub is organized in five main subdirectories: google, tensorflow, third-party, tools and util/python. Additionally, the root directory provides information on how to contribute to the project, and other relevant documents. In figure 3, the source code hierarchy is illustrated.

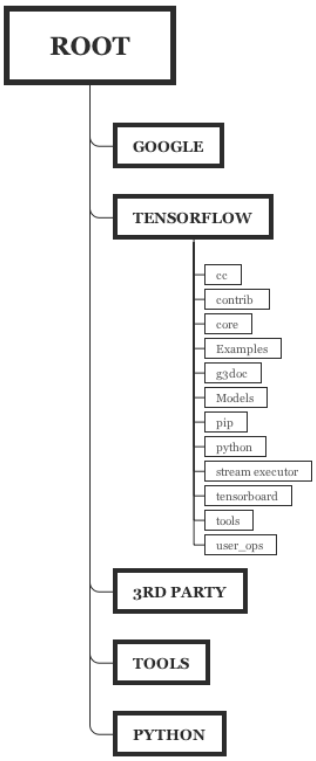

Abbildung 1.2: Source-Code-Hierarchie

Development-Sicht

Deployment-Sicht