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ProphetStor Case Study

AIOps - Erläuterung an einem Fallbeispiel

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AIOps steht für

- Algorithmic IT Operations
- Artificial Intelligence for IT Operations

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AIOps - Definition

AIOps platforms utilize big data, modern machine learning and other advanced analytics technologies to directly and indirectly enhance IT operations (monitoring, automation and service desk) functions with proactive, personal and dynamic insight. AIOps platforms enable the concurrent use of multiple data sources, data collection methods, analytical (real-time and deep) technologies, and presentation technologies

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Case Study

CPNC/BGP – China National Petroleum Corporation

HPC Optimierung mit ProphetStor DiskProphet

Hintergrund/Unternehmen

- CNPC ist eines der weltweit größten Unternehmen im Energiesektor
- BGP ist ein Tochterunternehmen, dass Geoanalysen als Dienstleistung anbietet
- HPC Datacenter mit über **3000 Serverknoten**
- Weltweit werden geophysische Daten erfasst, gesammelt und im HPC DC analysiert
- Die Analysen unterliegen strengen SLAs

Problembeschreibung

- HPC Cluster hat sehr hohe Anforderungen an den Datenspeicher
- Bildet eigenen scale-out cluster mit Direct Attached Storage
- DAS disks sind pro Knoten im RAID-0 konfiguriert
- Ausfall einzelner Festplatten ist durch den hohen Workload sehr wahrscheinlich
- Impact ist z.T. enorm
  - Analyseprozesse können abbrechen
  - Leistungseinbruch bei paralleler Verarbeitung
- SLA ist gefährdet

Lösungsansätze

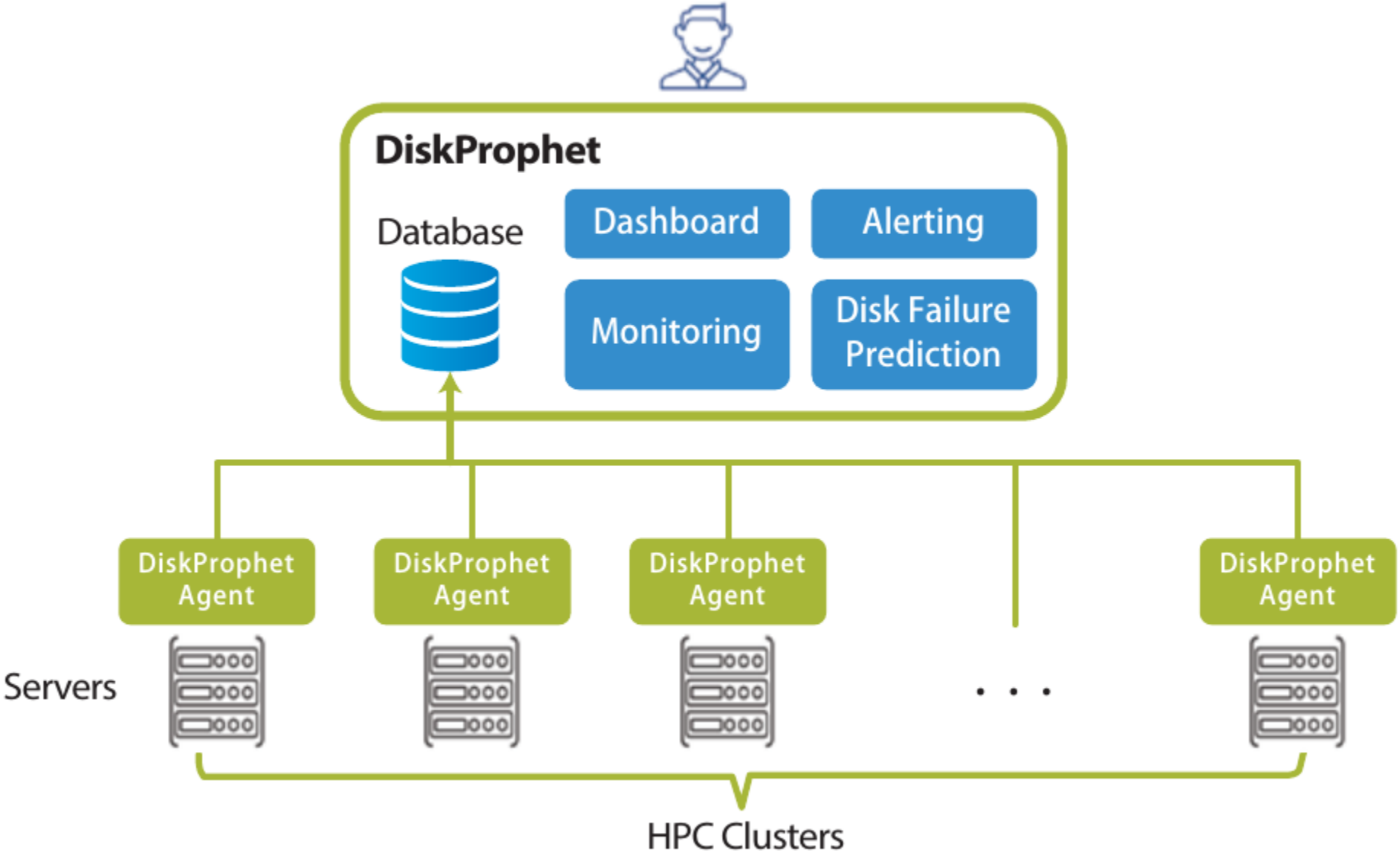
Traditionell

- Überprovisionierung von Ressourcen um Degradation zu kompensieren
- Kostenintensiv
  - Management
  - Floor Space
  - Energieverbrauch
  - Klimatisierung
  - etc.

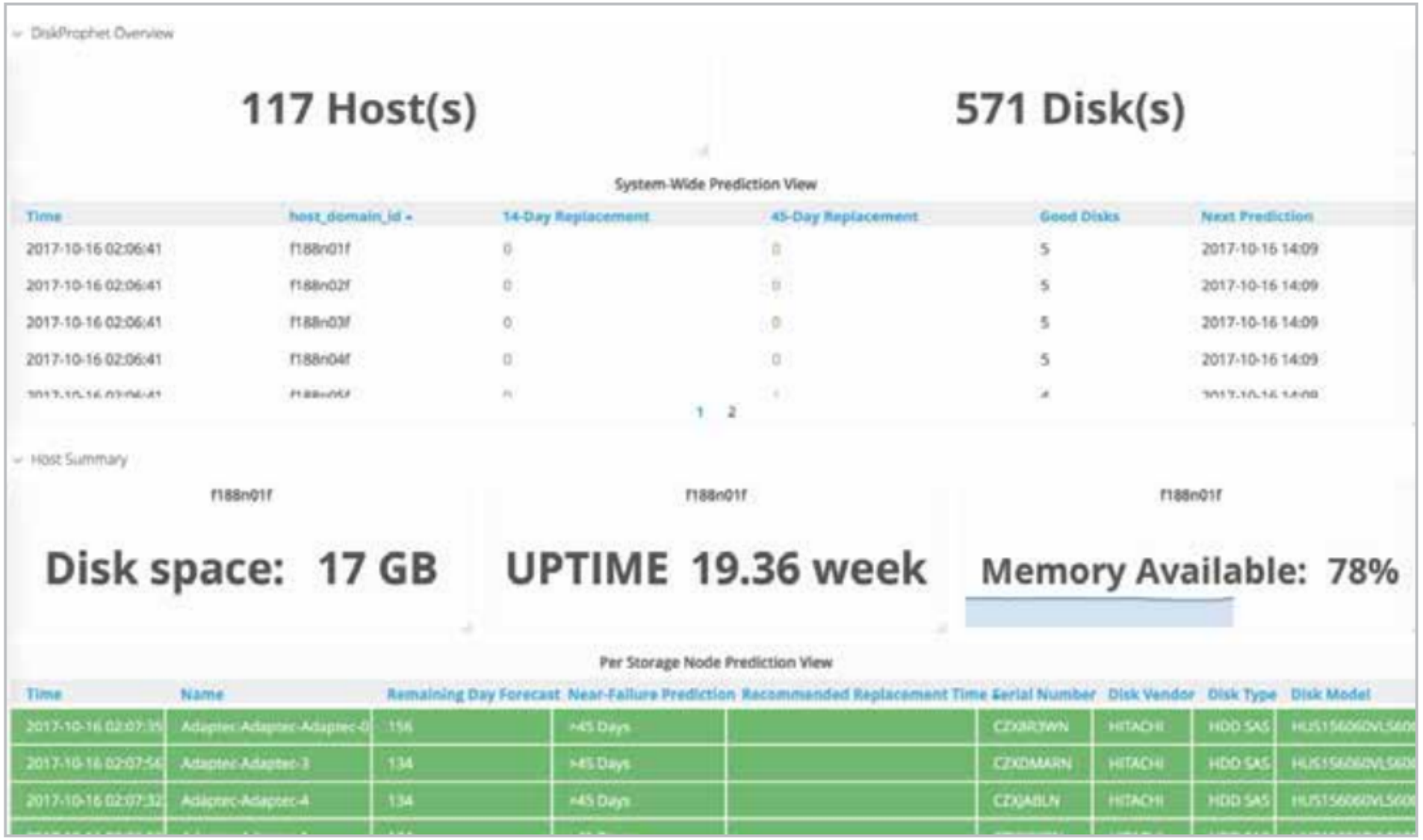
AIOps / DiskProphet

- DiskProphet für kontinuierliche Überwachung
  - Festplattenmetrik
  - Performancemetrik
  - Echtzeit / Historisch
- Machine Learning / AI Engine zieht selbstständig Schlüsse
- Ausfälle werden mit 95% Genauigkeit vorhergesagt
- Anomalien werden erkannt
- Empfehlungen für proaktive Maintenance

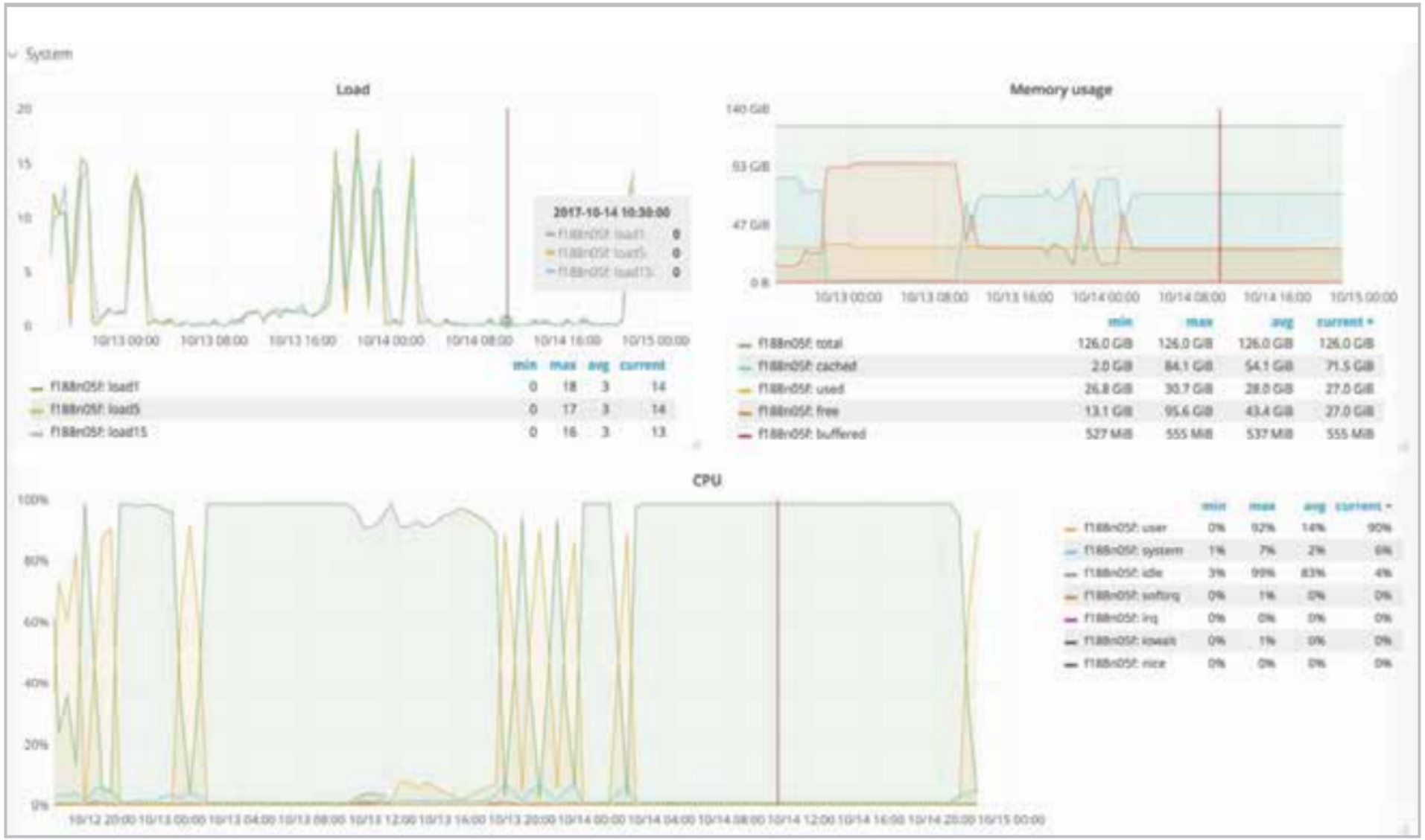
Lösungsarchitektur



Lösungsarchitektur



Lösungsarchitektur



Testimonial

It is **standard** for data centers and enterprises to acquire **higher graded servers**, or **more servers** than necessary to avoid SLA performance violations.

During the **DiskProphet evaluation** process, BGP/CNPC not only assessed the usability and stability of DiskProphet, but it also created **three-year financial prediction** when **comparing DiskProphet** deployment with the traditional **over-provisioning approach**.

They found that the most **significant** portion of the **ROI** is the **server procurement cut** and the **engineers' time** spent on random disk failure replace-ments.

Other than the aforementioned direct benefits, the indirect benefits included revenue gains from the **higher efficiency data analysis service** and **much less interrupted computing process**.

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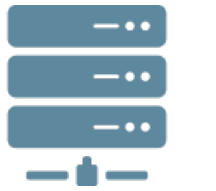
AI Engine

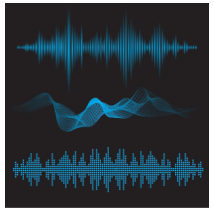
Weitere Use-Case
AIOps Vision

DiskProphet Engine



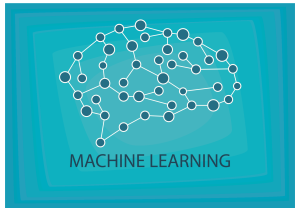
HDD SSD

SATA/SAS/NVMe



Disk signal processing

+



Deep Learning

Over 95% accuracy!

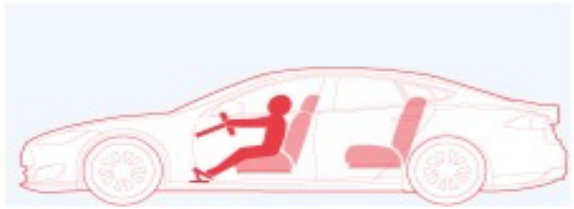
Disk Prediction

- Failure disks
- Fatigue disks
- Abandon disks

The Six Stages of Automation

Tesla and other companies are working on automated-driving systems that would eventually allow cars to drive themselves.

Level 0: No Automation



A human controls all the critical driving functions.

Level 1: Driver Assistance

The vehicle can perform some driving functions, often with a single feature such as cruise control. The driver maintains control of the vehicle.

Level 2: Partial Automation

The car can perform one or more driving tasks at the same time, including steering and accelerating, but still requires the driver remain alert and in control.

Level 3: Conditional Automation

Under Development

The car drives itself under certain conditions but requires the human to intervene upon request with sufficient time to respond. The driver isn't expected to constantly remain alert.

Level 4: High Automation

Under Development

The car performs all critical driving tasks and monitors roadway conditions the entire trip, and doesn't require the human to intervene. Self-driving is limited to certain driving locations and environments.

Level 5: Full Automation

Under Development

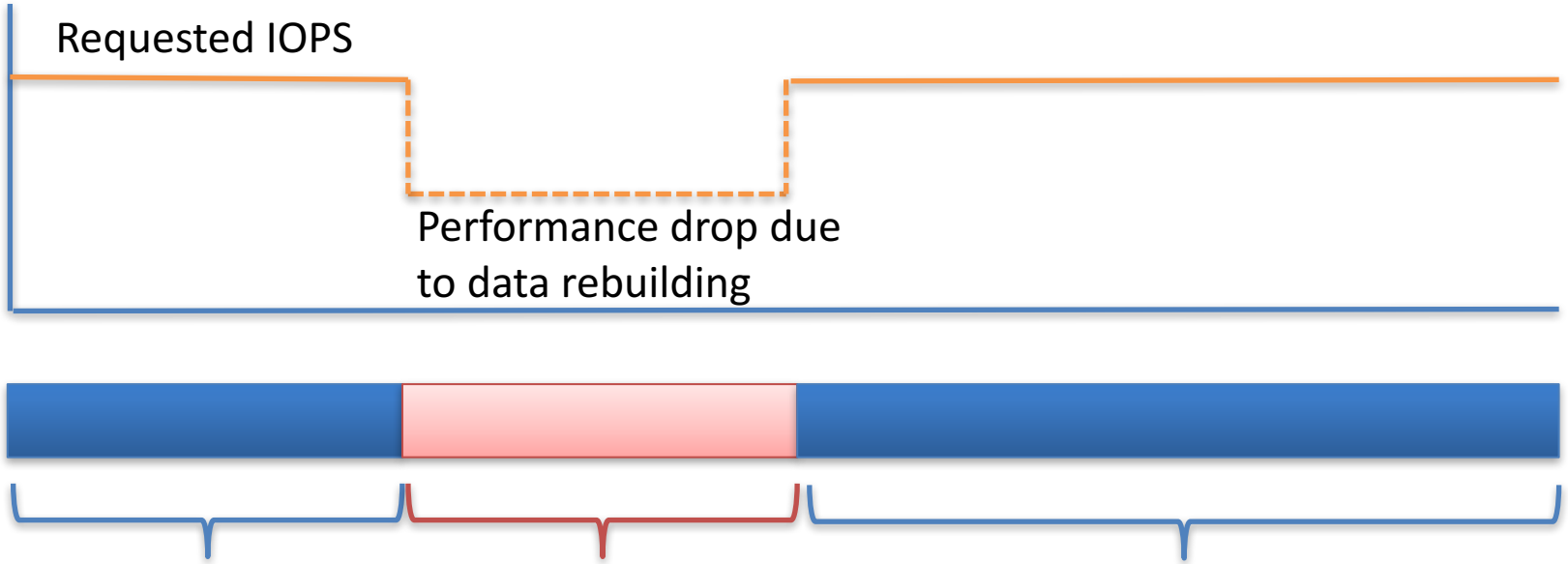
The Holy Grail. The car drives itself from departure to destination. The human is out of the loop. The car is as good or better than a human and steering wheels and pedals are potentially unnecessary.

Sources: SAE International; National Highway Traffic Safety Administration

Beispiele

- SDS Predictive Maintenance
  - VMware vSAN
  - Ceph
- Virtuell Infrastrukturen
  - VMware
  - OpenStack/KVM
  - Hyper-V
- Container Orchestrierung / Automatisierung
  - Docker
  - Kubernetes

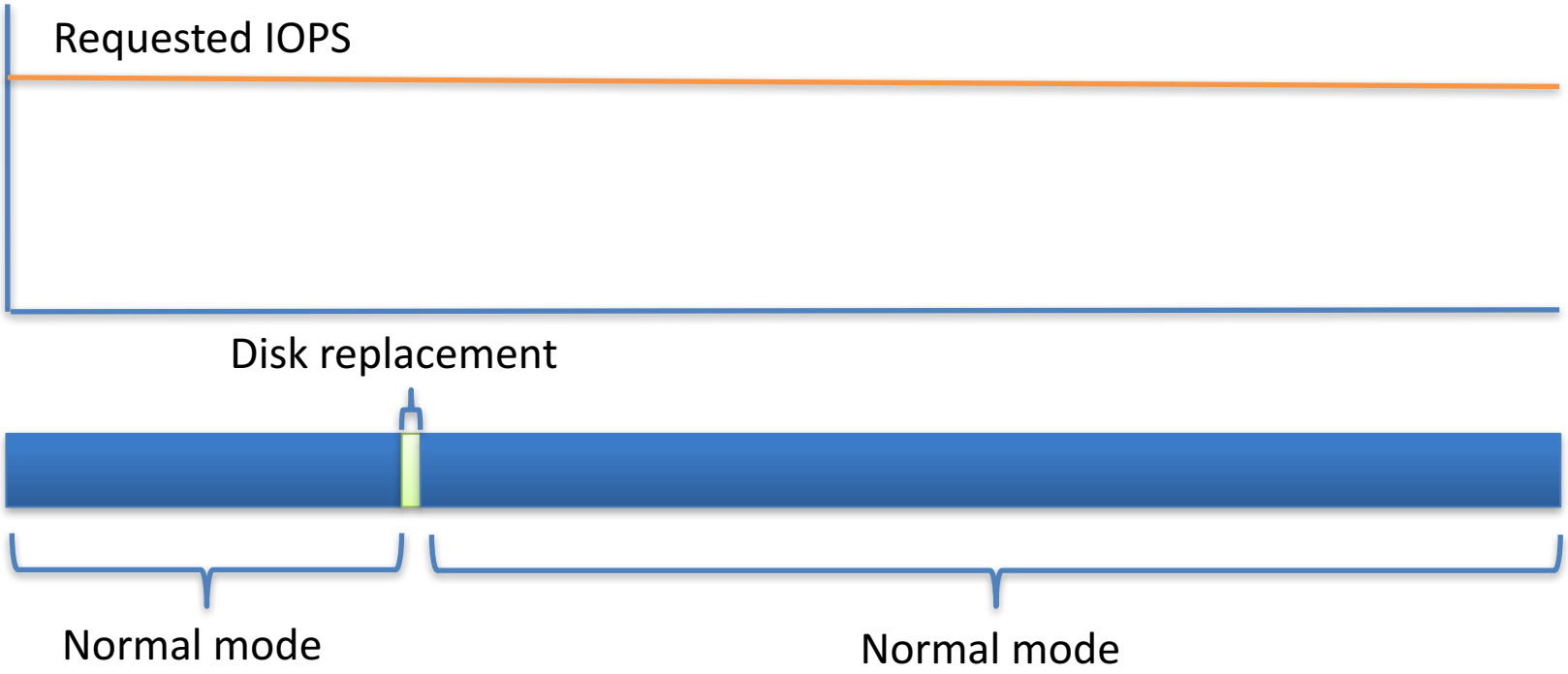
A disk is replaced after it is failed



- Performance degradation
- Risk of data loss
- Over-provisioning IOPS

It is costly and ineffective!

A disk is replaced when it has predictive failure



- NO performance degradation
- No risk of data loss
- No over-provisioning IOPS

It is cost-effective!
Less hardware to serve more customers!

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Dankeschön