

# Reliability of Cloud Scale Hardware Through Performance and Health Monitoring Using On-Chip Telemetry

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## INTRODUCTION

Cloud scale data centers push the limits of performance for zero down-time applications. Compute, networking, and storage infrastructure is dominating semiconductor consumption, with AI and HPC ASICs increasingly based on leading edge FinFET silicon manufacturing processes and advanced 2.5D and 3D packaging technologies. With these advanced technologies for always-on applications, comes a plethora of new challenges for hardware health and fault diagnostics.

proteanTecs introduces deep data analytics based on Universal Chip Telemetry (UCT), to assure production quality and lifetime reliability for a more robust, resilient, and easily maintainable data center.

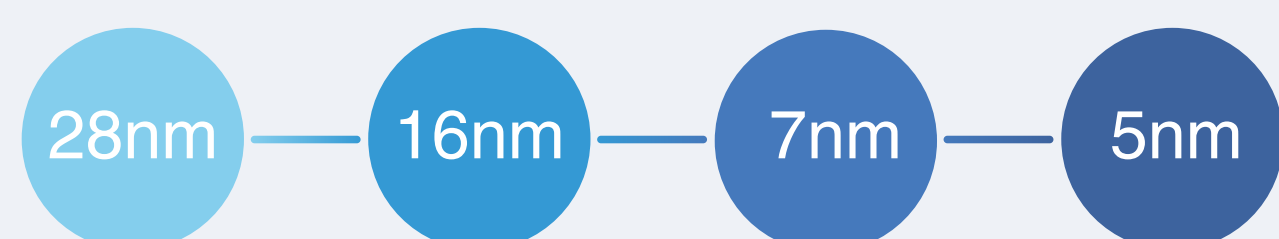
## ABOUT PROTEANTECS

Deep data health & performance monitoring for advanced electronics.

Trusted by hyperscalers, Fortune 100 corporations, OEMs, disruptive startups, as well as ASIC and IP vendors.

Serving customers in key industry segments including Datacenters, Communications, Automotive, and AI.

In use and silicon proven at high volumes



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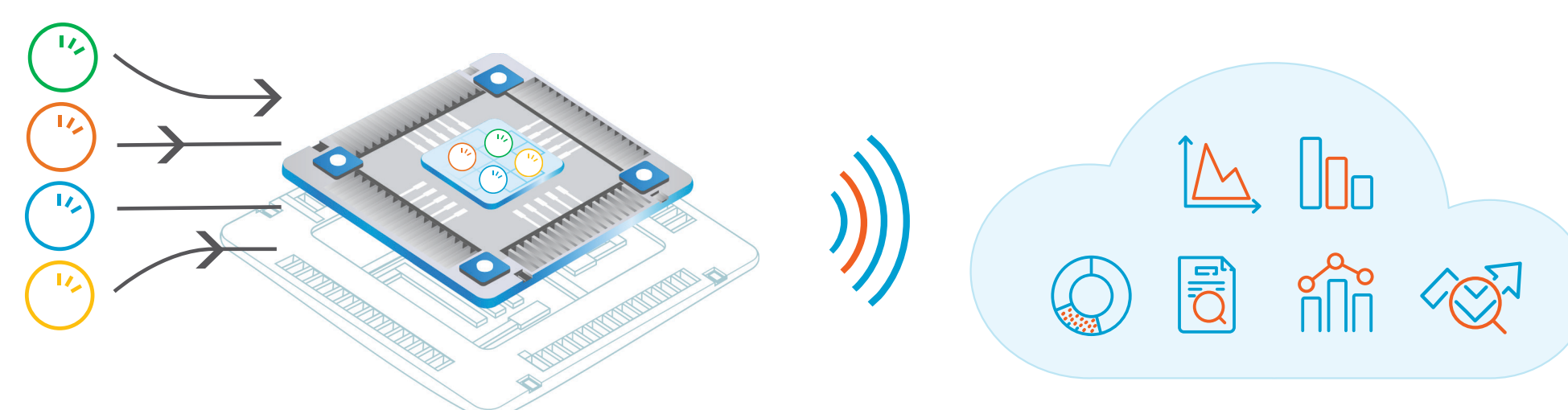


## METHOD

- ### Universal Chip Telemetry™ with On-Die Agents

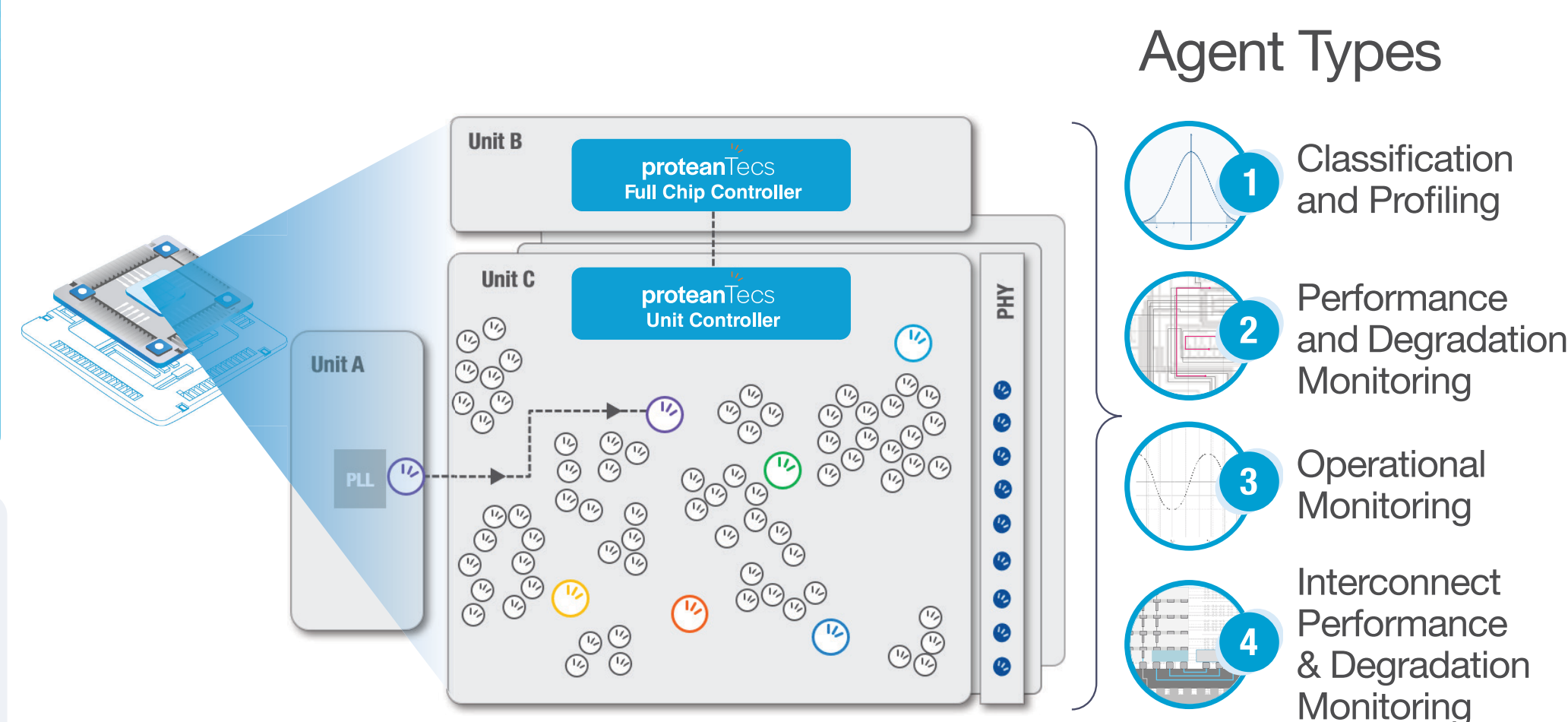
  - High coverage and high resolution
  - Negligible impact to PPA
  - Operate in mission-mode
  - Sense the surrounding electronics and application
  - Embedded at design using a custom suite of EDA tools
- ### Cloud-Based Platform with Automated Action Feedback

  - Advanced analytics for production optimization and in-field monitoring
  - Targeted solutions with built-for-analytics architecture
  - Knowledge based machine learning algorithms
  - Multi-dimensional Agent fusion
  - Open integration of 3rd party data

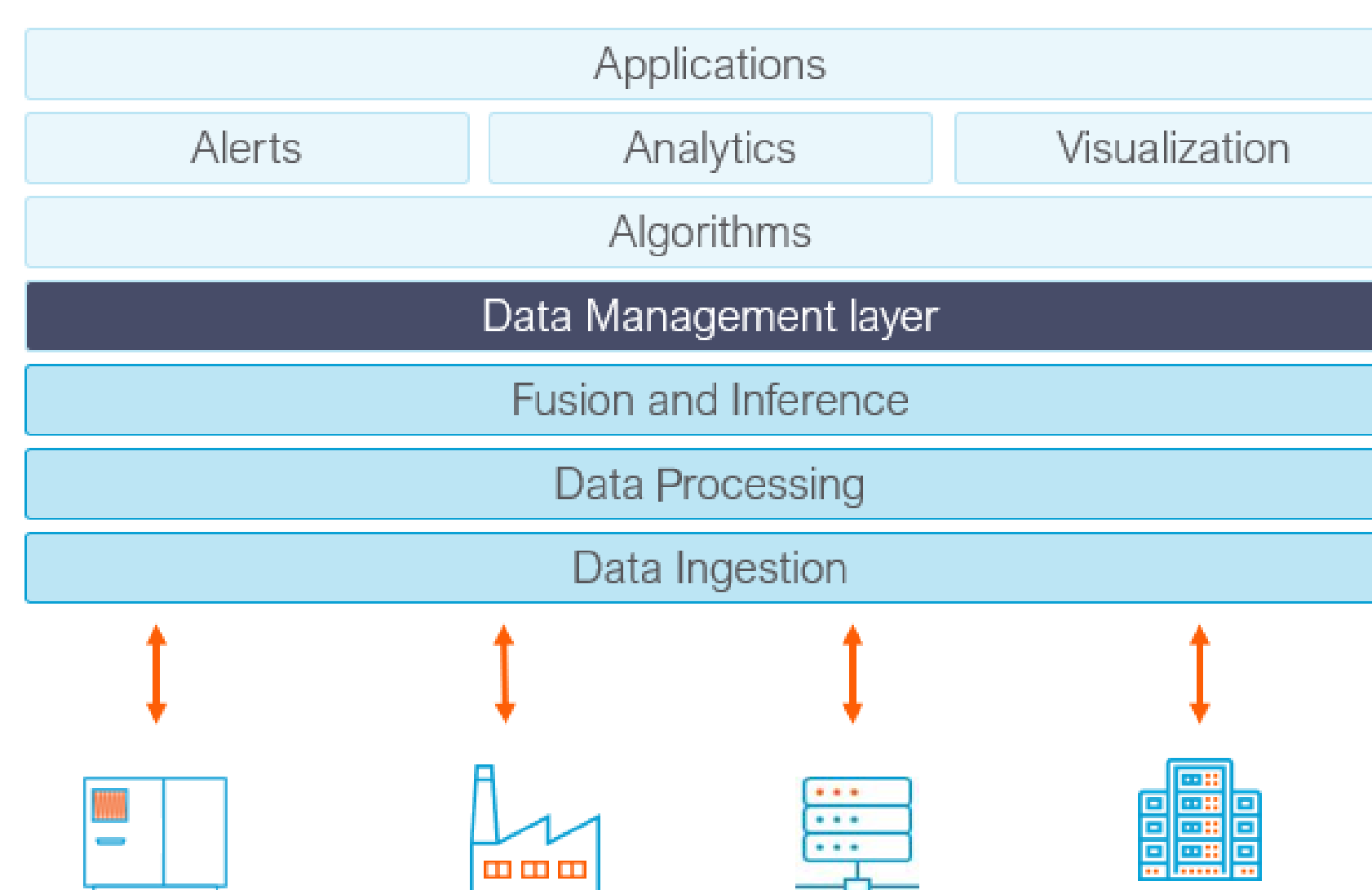


A holistic approach from design, through production and to the field.

### Maximum Coverage for Actionable Insights

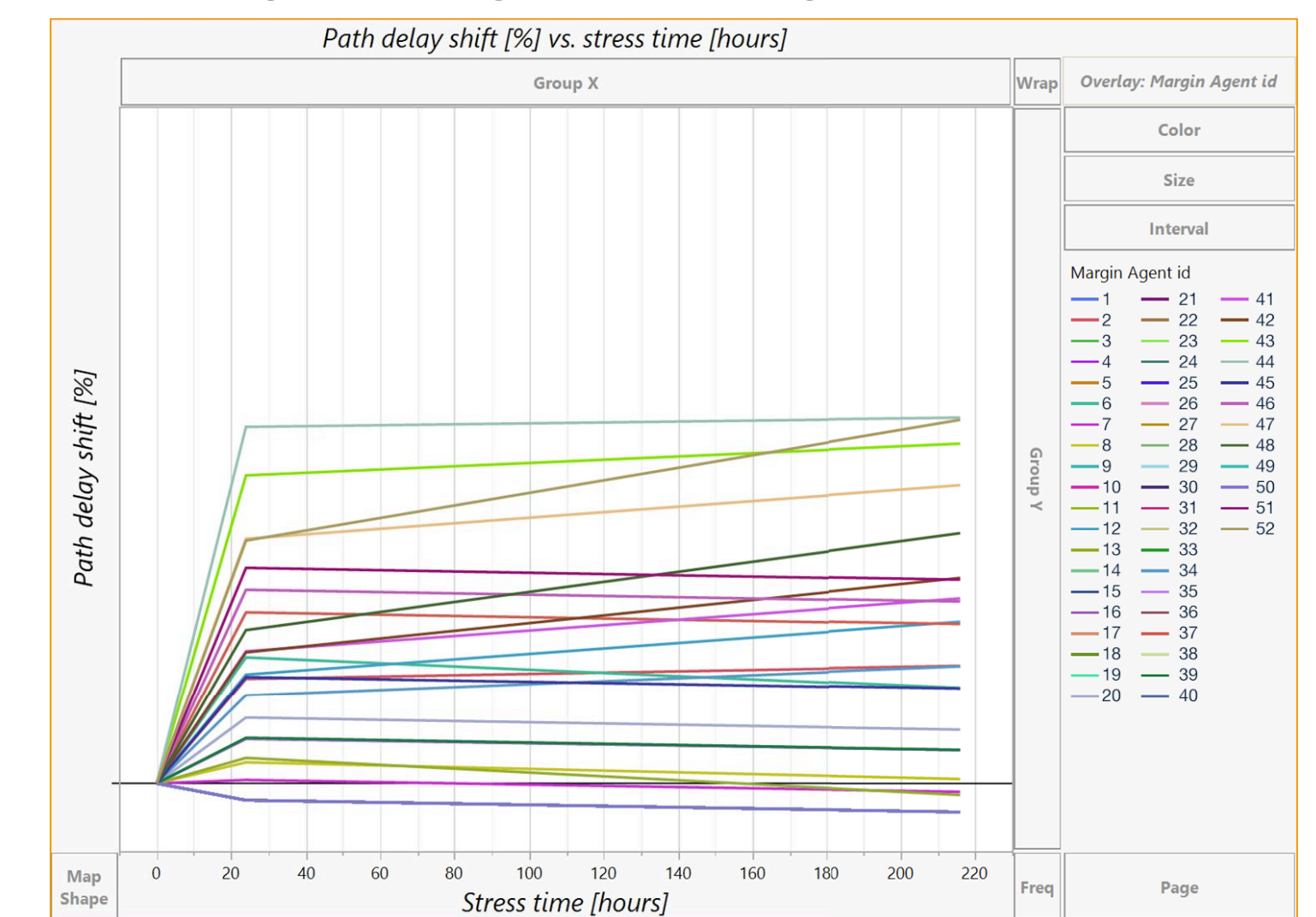


### Proteus Data Analytics Platform



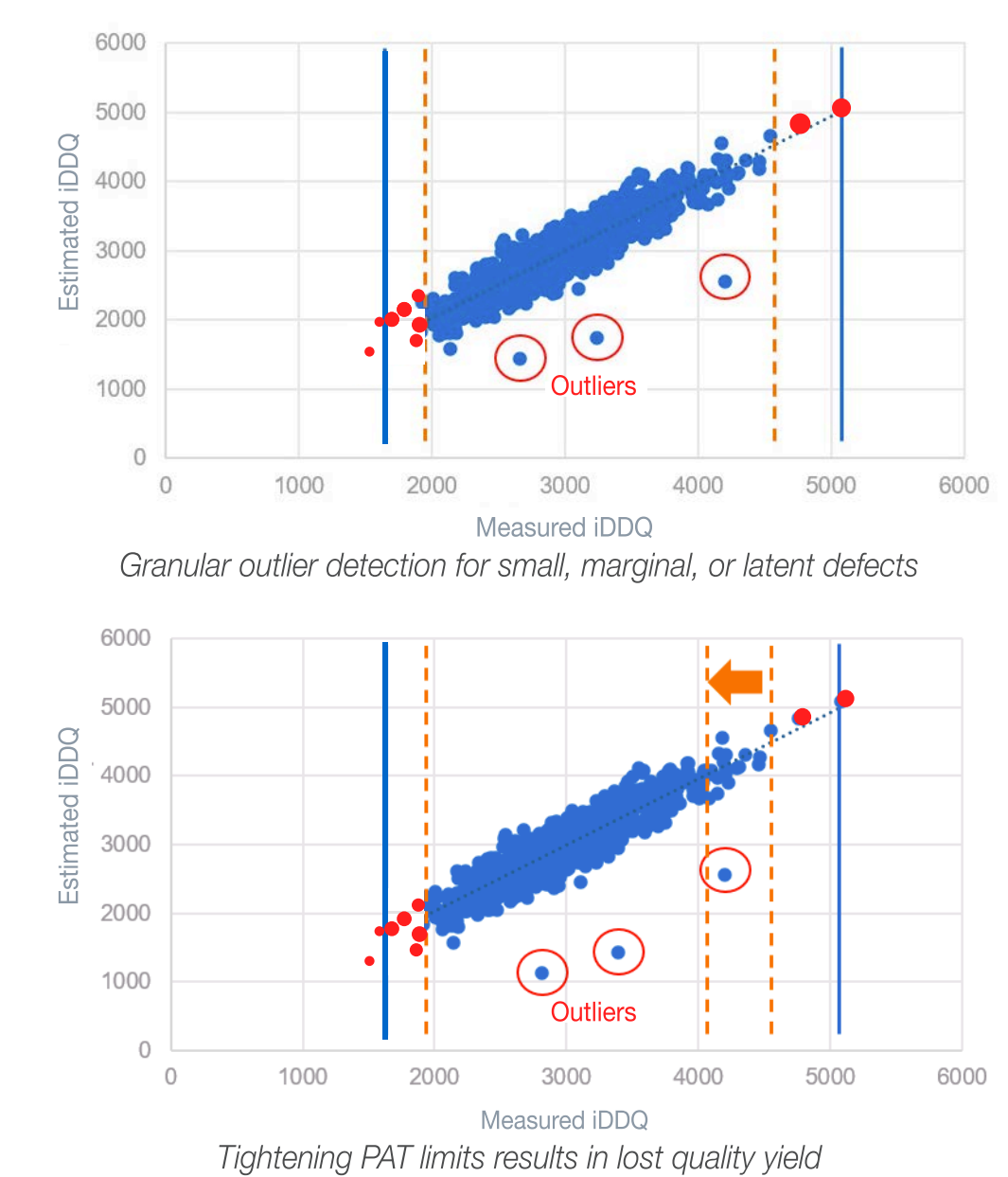
Measurements collected using the embedded UCT Agents are uploaded to the Proteus™ cloud-based platform to create deep data analytics. Proteus applies machine learning and dedicated algorithms to process the data, fuse the information from the entire fleet of chips and systems, and additional data sources, to produce meaningful and useful insights and alerts through a set of pre-configured dashboards.

### Deep insights during HTOL testing



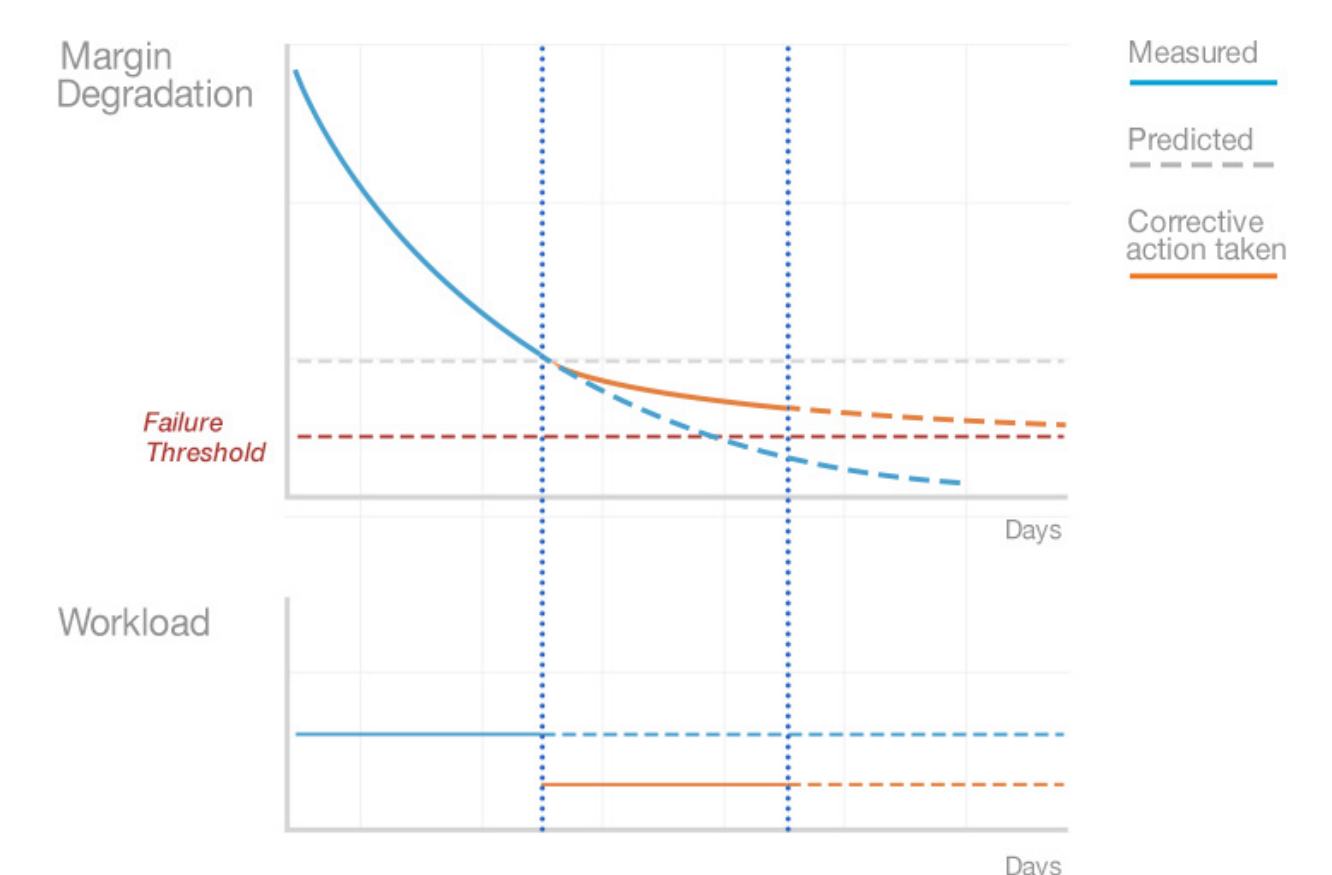
Going beyond pass/fail, high coverage timing margin insights allow for a better understanding into how different circuits of the IC age differently under the same test conditions.

### 10X DPPM Reduction with Precision-Based Outlier Detection



Proteus adds a new dimension for a much finer resolution of outlier detection, based on estimated iDDQ. Proteus personalized outlier detection compares each new tested device to its own prediction, not to an absolute upper and lower limit, to identify devices suspected with latent or marginal defects that could have otherwise been left undetected.

### Actionable Insights for Predictive Maintenance



Proteus provides in-mission health and performance degradation monitoring based on UCT data. Track, predict, and alert on aging, latent defects (with no manifestation in test), over stress or abnormal performance.

## CONCLUSION

Deep data analytics based on UCT allows chip and system manufacturers to develop and ship high quality devices, with greater confidence in their products' lifetime reliability. At the same time, Data Center operators can enjoy uninterrupted uptime, lower maintenance costs and the visibility required to scale advanced semiconductor devices in mission critical applications.