SiLA 2: The Next Generation Lab Automation Standard

Introduction

Throughout 2016, a subset of the SiLA community began developing a proof-of-concept of the next generation SiLA standard.

When designing SiLA 2, the working group applied knowledge and learning experiences from SiLA 1.x and made improvements in both conceptual and technical aspects to provide a **state-of-the-art technology base** centered around **outstanding and elegant concepts** that could easily **grow based on the collaboration of the community**.

SiLA 2 was defined on top of existing standards, clarifying the necessary items to fulfill the lab automation requirements. The next generation standard concentrates on functionality rather the devices, representing the behavior of the devices and not the underlying states and communication.

Areas of Improvement

- Service-oriented modular architecture focusing on features, not devices
- No mandatory commands; no mandatory state engine
- Improved event handling mechanisms
- Concurrent access clarified
- Lightweight to implement
- Improvements in versioning, including documentation
- Discovery based on existing standards
- And much more!

Technology Description

SiLA 2 is based on HTTP/2, an Internet engineering taskforce (IETF) standard. Like HTTP/1.1 which is the basis of the WWW, HTTP/2 is expected to be around for decades.

Key Design Principles

- **Message Driven**: Provide a taxonomy suitable for message exchange between systems while avoiding the pitfalls of distributed objects and the fallacies of ignoring the network.

- **Simplicity**: The technology stack should be available on every popular development platform and easily accessible. It should be viable on CPU & memory-limited devices.

- **Free & Open**: SiLA standards are free and open. SiLA should enable and support open-source efforts with licensing that facilitates adoption.

- **Interoperability**: The base communication protocol must be capable of surviving traversal over common internet infrastructure.

- **Pluggable**: A communication protocol is only part of a functioning infrastructure. Extensions should be possible without losing the original spirit and the reason for SiLA as a standard.

- **Metadata**: Common cross-cutting concerns like authentication should not rely on the exchange of data that is part of the declared interface but be transported separately.

- **Standardized Status**: Clients typically respond to errors in a limited number of ways. The status namespace should be constrained to make these error handling decisions clearer.

- **Features, not Devices**: Concentrate on capabilities/functionality rather than the devices, representing the behavior of the devices and not the underlying states and communication.

Conclusion

Early access to the SiLA 2 specification is available later this month for interested SiLA Members. The working group plans to have a release candidate available later this year, with a public release scheduled for mid-2017.