

Keck Next Generation Adaptive Optics Control Software Architecture Requirements

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- 1. The architecture shall be able to support the design and implementation of a distributed control system, particularly the NGAO control system.
- 2. The architecture shall be able to support maximum command update and processing rates of:
 - a. 40 Hz for tracking motion control applications. This is based on current observatory motion control channel update rates.
 - b. 10 Hz for normal synchronous control system commands.
 - c. Asynchronous command processing rates are highly dependent on the tasks being executed; hence we cannot specify a rate.
- 3. The architecture shall be modular and easily support the swapping in and out of different software modules.
- 4. The architecture shall support the transmission of arbitrary data types, both scalars and arrays, and data sizes up to a maximum of 1 Mb.
- 5. The architecture shall be scalable. It shall easily support additional components and computer nodes with no noticeable degradation in performance.
- 6. The architecture shall be distributable. It shall support multiple computer nodes distributed throughout the Keck summit network.
- 7. The architecture shall be able to support multiple platforms and operating systems: Sun/Solaris (x86, x64, and SPARC), Linux (x86, x64), Windows (x86, x64), VxWorks.
- 8. The architecture shall be able to support a distributed hierarchy of control functions.
- 9. The architecture shall support the following features:
 - a. Logging
 - b. Archiving
 - c. Events
 - d. Alarms
 - e. Health monitoring
 - f. Configuration
 - g. Scripting
 - h. Sequencing
- 10. The architecture shall support EPICS channel access for communication with the telescope control system (if necessary) and any instruments using the EPICS Channel Access protocol.
- 11. The architecture shall be designed and implemented using modern software design techniques and tools.
- 12. The software architecture and infrastructure shall be maintainable by the Keck software staff.
- 13. The software architecture and any third-party software shall be supportable and maintainable for the expected lifetime of the system (10 years).
- 14. The architecture shall be flexible and reusable to support other control system applications outside of NGAO.
- 15. The architecture shall support the addition of new types of control system hardware, assuming that device drivers are available from the manufacturer.
- 16. The architecture shall be capable of supporting existing hardware families in use at Keck.