

# Application Architecture Checklist

The Application Architecture Checklist is intended to be a tool used by Harvard to assess applications that are proposed for inclusion in the portfolio of applications.

**Intended Audience:** This document is intended for technical members of application design or procurement teams. These could be Solution Architects, Program/Project Managers, or any team member who feels comfortable conducting an investigation using this material.

**Recommended Usage:** Identify the style of application and match to the appropriate column: Developed Solutions, Purchased Solution - Private Cloud, Purchased Solution - Hosted, or Subscription - SaaS. Use the checkmarks to track progress through the categories and questions. The numbering scheme is for internal use only.

**Definitions:** Developed Solutions - those that are implemented and maintained by Harvard resources  
Licensed Solution - Harvard's Cloud - commercial products that are implemented and managed in Harvard's cloud  
Licensed Solution - Vendor Hosted - commercial products that are used and managed from a vendor's cloud  
Subscription - SaaS - vendor solutions that are multi-tenant and generally subscription-based  
MUST - considerations that are important and must be accommodated, or a waiver received  
SHOULD - considerations that are directional and reflect the HUIT direction and values and should be honored

### Application Architecture Checklist






Version 1.0  
General

Developed Solutions      Licensed Solution - Harvard's Cloud      Licensed Solution - Vendor Hosted      Subscription - SaaS      Notes

General	Project Name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General	Project's sponsoring organization – Define the project's business ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General	Project's operating organization – Define the project's on-going operational ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General	Vision and Purpose of the project – Describe the project purpose and expected outcomes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
General	User constituents – Describe and quantify the main communities of users	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Functional

F1 Security	The solution <b>MUST</b> protect data and functionality to the level needed by the sponsoring organization and appropriate to the operational risk profile of the solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F2 Security	Solution data <b>MUST</b> be separated from other tenants, ideally by providing a dedicated database or dedicated schema.				<input type="checkbox"/>	
F3 Security	The solution <b>MUST</b> integrate with Harvard's single-sign-on authentication service Harvard Key, using either CAS or SAML2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F4 Security	The solution <b>MUST</b> provide role-based authorization to users of the solution, either as a feature of the application or through an authorization service such as Group Services, in accordance to the principle of least privilege.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F5 Security	Solutions <b>MUST</b> conform to the appropriate HUIT security policies ( <a href="https://policy.security.harvard.edu/security-requirements">https://policy.security.harvard.edu/security-requirements</a> ). Consult with your ISO for guidance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F6 Security	The solution <b>MUST</b> constrain the permitted network, service, and package interactions that are allowed, in accordance to the principle of least privilege (for example DDNS protection, port visibility black/white listing).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F7 User Experience	Applications <b>MUST</b> meet the HUIT accessibility policy ( <a href="http://accessibility.huit.harvard.edu/huit-policy">http://accessibility.huit.harvard.edu/huit-policy</a> ).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F8 User Experience	The solution <b>SHOULD</b> work with both computers and mobile devices. Web-based solutions should work with a variety of industry-standard web browsers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F9 User Experience	The solution <b>SHOULD</b> provide a modern user experience where the interface and workflow designs provide access to desired outcomes with the least friction. <a href="https://projects.iq.harvard.edu/harvarduxgroup/home">https://projects.iq.harvard.edu/harvarduxgroup/home</a>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F10 User Experience	The solution's ornamentation, including branding, color schemes, look-and-feel, and navigation schemes <b>SHOULD</b> conform to Harvard branding standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F11 Applications	The solution's design <b>SHOULD</b> make use of shared services in order to avoid duplicating existing capabilities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F12 Application	The solution <b>SHOULD</b> be instrumented so key aspects of the design, for example specific transactions or process durations, can be monitored with Harvard's chosen monitoring infrastructure: CloudWatch and Nagios.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F13 Interoperation	The solution <b>MUST</b> clearly identify all service and external interactions including data sets transferred, frequency and schedules of flows, mechanisms and protocols of transfer, and API services used and offered to others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F14 Interoperation	Applications <b>SHOULD</b> provide APIs (preferably REST) for loading & extracting data, for configuration, and for monitoring. Bonus point for providing APIs which permit application remote control like invoking business processes. APIs should be versioned, and as new versions are released adequate time must be given for conversion before older versions are retired.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F15 Data	The solution design <b>SHOULD</b> identify data managed by the solution that is considered 'system-of-record', data that is duplicated from other sources and offered to others as 'authoritative sources', and data that integrates with any master data management processes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
F16 Data	The solution <b>SHOULD</b> favor cloud-based persistence repositories, and tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
F17 Data	The solution <b>SHOULD</b> persist its data to a HUIT-supported RDBMS system like Oracle, MySQL, or Microsoft SQL Server	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
F18 Middleware	The solution <b>SHOULD</b> favor HUIT-supported middleware services such as IAM, databases, monitoring, logging, notification, and other services, instead of building these capabilities or using unsupported capabilities	<input type="checkbox"/>	<input type="checkbox"/>			
F19 Middleware	The solution <b>SHOULD</b> provide logging and audit information necessary to provide operational support and to meet our Price-Waterhouse-Coopers audit requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

<b>F20 Infrastructure</b>	The solution <b>MUST</b> run on a modern industry-standard OS, one of Red Hat Enterprise Linux, Amazon Linux or Microsoft Windows. Linux is preferred.	<input type="checkbox"/>	<input type="checkbox"/>			
<b>F21 Infrastructure</b>	The solution <b>MUST</b> be designed for cloud deployment, and should take advantage of cloud features (e.g. supporting auto-scaling, load balancing across geographic locations, etc.).	<input type="checkbox"/>	<input type="checkbox"/>			
<b>F22 Networking</b>	The solution <b>SHOULD</b> be able to operate on internal networks <i>and</i> over the internet, unless security constraints exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		





**Systemic**

<b>S1 Performance</b>	The solution interface and processing <b>MUST</b> meet the responsiveness requirements set by the project team	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S2 Throughput</b>	The solution <b>MUST</b> be designed to meet all data transfer throughput requirements in Harvard's environments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S3 Scalability</b>	The solution <b>MUST</b> be able to support the expected range of user, processing, and communications loads both initially and over time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S4 Reliability</b>	The solution <b>MUST</b> be able to remain functional using failure recovery techniques, in alignment to the project team requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S5 Availability</b>	The solution <b>MUST</b> be available to users in conformance to project team requirements. Maintenance downtimes must be scheduled and documented as part of a Service Level Agreement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S6 Extensibility</b>	The solution <b>SHOULD</b> provide a modular design that allows activation and deactivation of capabilities without disruption	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S7 Manageability</b>	The solution <b>SHOULD</b> provide a design that allows maintenance to take place while users are still connected	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>S8 Serviceability</b>	The solution <b>SHOULD</b> provide the ability to fully or partially transition from full production operation to an off-line or maintenance mode	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	










**Operations**

<b>O1 Schedules</b>	The project team or vendor <b>MUST</b> document operational requirements, including a list and schedule of tasks Harvard operations and administrative staff are required to perform on the solution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O2 Schedules</b>	The operations team or vendor <b>MUST</b> publish availability / outage / maintenance schedules, including the agreed solution outage schedule	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O3 Schedules</b>	The operations team or vendor <b>MUST</b> document automated job schedules, including the job automation approach, and describe the jobs that are required for regular solution operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O4 Schedules</b>	The operations team or vendor <b>MUST</b> publish interoperation job schedules, including the frequency, timing, and approximate duration of system-to-system interactions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O5 Schedules</b>	The operations team or vendor <b>MUST</b> document backup schedules, including the frequency and timing of incremental and full backups, and the retention intervals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O6 Schedules</b>	The project team or vendor <b>MUST</b> document DR & BC approaches, as well as synchronization and test schedules, including the DR and BC plan resources and testing schedules	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>O7 Support</b>	The support organizations <b>MUST</b> be aware of the level 0 and level 1 support requirement from users of this solution, and intend to meet them	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Development**

<b>D1 Environments</b>	All projects <b>MUST</b> deploy two environments dedicated to Production and Test. Additional environments may be deployed in support of development, integration, diagnosis, staging, and other roles.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>D2 Documentation</b>	Technical, operational, and user documentation <b>MUST</b> be provided and should include complete technical detail such as functional and procedural guides, technical configurations and customizations, on frameworks, libraries and services in use, on TCP/IP ports in use, etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
<b>D3 Tools</b>	Project team or vendor <b>MUST</b> provide tools for moving data, configurations, and other artifacts between the environments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>D4 Tools</b>	The project team <b>MUST</b> use a common artifact repository and version control techniques for change management	<input type="checkbox"/>				
<b>D5 Tools</b>	The project team or vendor <b>SHOULD</b> use a consistent change management toolset for code promotions, data replication, data deidentification, and other cross-environment activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>D6 Tools</b>	The project team or vendor <b>SHOULD</b> use a consistent set of testing tools, and processes including test plans, test cases, result, data, automation, and regression tools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

**Governance**

G1 Organization	The project team <b>MUST</b> have a defined structure, generally described by an organizational chart, which describes the project team role structure and staffing	<input type="checkbox"/>			
G2 Methodology	The project team <b>MUST</b> adopt a consistent methodology to structure work and measure progress	<input type="checkbox"/>			
G3 Methodology	The project team <b>MUST</b> have documented workflows which describe design, development, testing, change management, and other processes	<input type="checkbox"/>			<input type="checkbox"/>
G4 Communication	The project team or vendor <b>MUST</b> have a reporting process that communicates status and progress to internal and external communities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
G5 Communication	The vendor <b>SHOULD</b> be able to provide a product roadmap, and when significant change appears in that roadmap both the business and HUIT should evaluate potential impact.		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>