

	Portability	Extensibility	Documentation	Support	Packaging	Intellectual Property issues	Standards compliance	Verification & Testing	Modularity
Level 1	The software is not portable at any cost	No ability to extend or modify program behavior	Limited internal documentation available	No support available	Source code available	Potential owners and stakeholders of product have been identified.	Follows no particular standard	No testing performed	No designs for modularity or reuse
Level 2	Some parts of the software may be portable	Prohibitive costs and efforts need to modify or extend the system	Fully commented source code available	Known contact available		Relevant intellectual policies of potential owners and stakeholders have been reviewed.	Follows some parts of common standards and best practices	Software application formulated and unit testing performed	
Level 3	The software is only portable with significant costs	Can be extended with the input of considerable time and effort on par with recreating system separately	Basic external documentation available	Original developers provide proactive support	Detailed installation instructions available	Intellectual property agreements have been proposed to potential stakeholders.	Follows a company-wide standard for development and testing	Testing includes testing for error conditions and proof of handling input errors	Modularity at major system or subsystem level only
Level 4	The software may be portable at a reasonable cost	Can be modified and extended through configuration changes, minimal modification of source	Reference manual available	Latest updates or patches are available but not very frequently		Potential stakeholders have negotiated on intellectual property agreements and authorship issues.	Most components follow a complete, universal standard, but not validated	Software application demonstrated in a laboratory environment	
Level 5	The software is moderately portable	Consideration for future extensibility designed into system, extensibility approach somewhat defined	User manual available	Informal user community available	Software is easily configurable for different environments	Agreement and approval on authorship, attribution, and intellectual property issues has been obtained from stakeholders.	All components follow a universal standard, but only partially validated	Software application tested and validated in a laboratory environment	Partial segregation of generic and specific functionality
Level 6	The software is portable	Designed from the start to allow easy extensibility, provides many points of extensibility and a thorough and detailed extensibility plan	Tutorials available	Centralized support available		Authorship, attribution, and intellectual property statements have been drafted to reflect agreement among stakeholders on intellectual property and authorship.	Validated to follow a specific proprietary standard	Software application demonstrated in a relevant environment (Earth science related)	
Level 7	The software is highly portable	Proven to be extensible internally, code structured to provide loose coupling and high cohesion	Interface guide available	Organized/defined support by the original developer available	OS detect and auto-build for supported platforms	Authorship and intellectual property statements included in product prototype.	Validated to comply to a specific open standard	Software application tested and validated in a relevant environment (Earth science related)	Clear delineations of specific and reusable components
Level 8		Proven extensibility on a major external program, provides a clear plan for modifying and extending features	Extension guide and/or Design/Development guide available	Support by organization available		Manifestation of authorship, attribution, and intellectual property statements reviewed in product prototype before product release.	Proven by validation to comply with a "gold" standard	Software application "qualified" through test and demonstration (meets requirements) and successfully delivered to the Earth science environment	
Level 9	The software is completely portable	Proven extensibility in multiple scenarios, provides specific documentation and features to build extensions	Full software lifecycle engineering design documentation available	Large user community with well-defined support available	GUI installation environment provided	Reviewed authorship, attribution, and intellectual property statements packaged with product for release.	"Gold" standard compliance of entire system and development, independently validated	Actual software application tested and validated through successful use of application output	All functions and data encapsulated into objects or accessible through web service interfaces

RRL 1	No potential for reuse: no support, contact information, author attribution, or rights specified. Limited source code. Inadequate or no documentation, not extensible.	Software is essentially not reusable; source code available, but little else.	The software is not considered reusable. The costs of trying to reuse the software are not definable.	Not reusable, or cost prohibitive	No reusability -- software is not reusable
RRL 2	Reuse would be challenging and prohibitively costly: some source code, documentation, contact information. Authorship and reuse rights unclear.	Initial reusability, but may be cost-prohibitive; initial testing done and some contacts known.	The cost of reusing the software is prohibitively high, but it may be useful for some users.	Reusable at a significant cost comparable to development without reuse	Initial reusability -- software reuse is not practical
RRL 3	Reuse possible by experts with detailed instructions, completed code, and some support, but requires considerable effort by general users with unspecified rights.	Basic reusability, but may require much time and effort; some modularity and standards coverage, IP agreements proposed, developers provide support, detailed installation instructions.	The software is reusable, but only with significant costs. Particular users may benefit.	Moderate cost and effort savings from reuse	Basic reusability -- software might be reusable by skilled users at substantial effort, cost and risk
RRL 4	Software and documentation complete and understandable, difficult to use, barely sufficient for reuse, tested on specific platform	Reuse is possible; software is lab-tested, reference manual and patches available, IP issues negotiated.	The software may be reusable at a reasonable cost.	Selected components offer major cost and effort savings from reuse	Reuse is possible -- software might be reused by most users with some effort, cost and risk
RRL 5	software and documentation configurable, not tested, used by small user community of experts, possible general use, authorship and rights not specified.	Reuse is practical; software is portable, modular, extendable, and configurable, has low-fidelity standards compliance, user manual and user community, demonstrated in lab.	The software is moderately reusable for most users at a reasonable cost.	Main components reusable at moderate effort	Reuse is practical -- software could be reused by most users with reasonable cost and risk
RRL 6	Software and documentation has limited applicability, some functionality, has FAQ and potential to be interfaced, but authorship and rights not formalized.	Software is reusable; designed for extensibility, modularity, portability, tutorials available, IP statements drafted, demonstrated in relevant environment.	The software can be reused by most users although there may be some costs.	Main components reusable at little effort	Software is reusable -- software can be reused by most users although there may be some cost and risk
RRL 7	Software and documentation applicable for most systems, complete attribution and rights stated, tested internally, supported by developer	Software is highly reusable; highly portable and modular, high-fidelity standards compliance, auto-build installation, developer-organized support, interface guide, lab validation.	The software is highly reusable by most users with little or no costs.	Majority of components are easily reusable, some are harder to reuse	Software is highly reusable -- can be reused by most users with minimum cost and risk
RRL 8	High potential for portability and modification of software by highly skilled users, authorship and rights specified, supported by organization	Demonstrated reusability; shown to be extensible, has extension guide, IP reviewed in product before release, organization-provided support, qualified through test and demonstration.	The software is reusable by almost all users. Some users with unusual or outdated platforms may find difficulty.	Built to allow easy reuse of majority of components	Demonstrated reusability -- software has been reused by multiple users
RRL 9	Package encapsulated, portable, fully documented, and complete with clear attribution and permissions for implementation potential by various user levels using GUI installer with community contributing patches	Proven reusable; fully portable and modular, all appropriate documentation and standards compliance, GUI installation, large support community, tested and validated through successful use of application output.	The software is fully reusable by all users.	Designed from ground-up for reuse	Proven reusable -- software is being reused by many class of user over a wide range of system
NOTES	Inconsistencies within each level across areas regarding reusability for level of user				