



Experience the commitment®

# RCDA: Risk- and Cost-Driven Architecture

Solution architecture for the agile age



The idea of architecture in the digital world sounds good. Put a “masterbuilder” in charge of the design of your IT-based solution—someone who understands and connects the business and technology aspects—to ensure sound construction and future-proof quality. The reality, however, can be quite different. Some architects are able to communicate with business managers only in technical terms, and architecture sometimes obstructs agility. Delivering solutions without architecture is reckless, but how can architects better serve the needs of the agile business?

CGI’s solution architects view architecture as a risk and cost management discipline. This helps them focus on architectural concerns with the highest business impact. They reason and communicate about those concerns and the design decisions that address them in economic terms and use agile principles to accommodate the level of responsiveness needed in today’s fast-moving business world. The principles and practices behind this have been incorporated into CGI’s Risk- and Cost-Driven Architecture (RCDA), an agile solution architecture approach.

# Architecture and agility

**E**ver since the introduction of agile development around the turn of the century, people have wondered how to combine agility with architecture. The difficulty of combining the two is due in part to a fundamental difference in goals between the agile and architecture approaches. Architects look for stability and future proofness, while agilists want to embrace change, looking for a kind of “future looseness.”

**Looking more closely, one sees that architecture and agility represent two ends on a spectrum. The optimal place for your project to reside on this spectrum depends on the project context.**

Some say architecture and agility are conflicting approaches. The agile proponents’ attitude towards Big Up-Front Design (BUFD) certainly seems to directly oppose the idea of architecture-driven development. This perception of conflict is increased by the agile movement’s tendency to behave like a religion, complete with dogmas and heretics, as wittily described by Philippe Kruchten<sup>1</sup>. On blogs, agilists sometimes post rants against any suggestion towards up-front thinking about a solution’s architecture or any hint that not all key (quality) requirements can be addressed afterwards by magically refactoring an IT solution.

Looking more closely, one sees that architecture and agility represent two ends on a spectrum. The optimal place for your project to reside on this spectrum depends on the project context. Barry Boehm suggests that the ideal place on this spectrum depends on three factors that together determine the amount of architecture needed beforehand: the size of the project, the volatility of the environment, and the business criticality of the solution<sup>2</sup>.

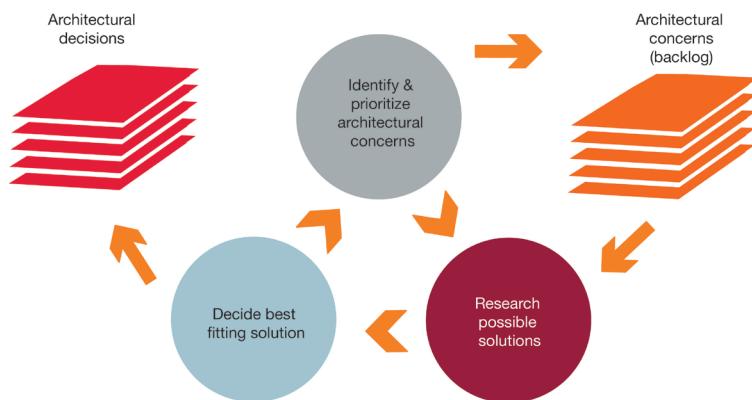
Agilists can become more successful if they take the project context into account when assessing the usefulness of architecture, but what can architects do to cross the divide between agility and architecture? Judging by TOGAF, the Open Group’s popular architecture framework, the principles in the Agile Manifesto have long been neglected by the architecture community. ADM, the TOGAF architecture development method, contains extensive processes like Business Architecture, Information Systems Architecture and Technology Architecture, which may produce rather bulky documents.

Adapting this type of enterprise architecture approach to an agile environment is non-trivial and requires tailoring by experts. In the software architecture world, lighter architecture approaches like George Fairbanks’ “Just Enough Architecture” are gradually gaining ground. These more agile approaches no longer view architecting as mainly a design discipline, but also as a way to control risk and deal with uncertainty.

---

<sup>1</sup> “Voyage in the Agile Memeplex,” Philippe Kruchten, ACMQueue 5, July 2007.

<sup>2</sup> “Architecting: How Much and When?”, Barry Boehm in Making Software: What Really Works, and Why We Believe It, Andy Oram and Greg Wilson (Ed), O'Reilly Media, 2010.



RCDA's architecting workflow: a backlog of architectural concerns is used to increase agility

RCDA is a relatively new approach in this arena. It was developed to close the gap between enterprise and software architecture. Existing software architecture practices often are too limited in scope for the solutions that need to be architected. However, enterprise architecture practices are too heavy for the agility required to manage time pressures and frequently occurring changes and uncertainty. RCDA incorporates a number of aspects from agile software development practices, such as the use of a backlog of architectural concerns, to be frequently reprioritized based on economic factors like risk and cost.

The secret of making architecting agile is to change your view of the main deliverable of the work, just like with agile software development methods. An agile software development team does not deliver a “big-bang system,” but a continuous stream of improvements to a system. In the same way, an agile architect does not deliver a “big up-front design,” but a continuous stream of architectural decisions, step by step, gaining control of the uncertainties and risks surrounding complex IT solutions. How much architecture to build in is determined not by agile dogmas like, “You Ain’t Gonna Need It” (YAGNI), but by economic trade-offs taking into account the real value of architecture in context.

Architects can do much to cross the divide towards agility; in fact, they not only can, but must. If they don’t make this effort, architecture departments will lose touch with their IT development departments where agile methods have become mainstream, as well as with their business stakeholders who continually demand faster and better responses to changing market conditions. The key change architects need to make is to no longer view architecture as a design document to be delivered to projects up-front, but as a continuous decision making process for gaining control over costs, risks and uncertainty. Only then can architects deliver the added value and flexibility required by their business stakeholders.

**RCDA is a recognized method in the Open Group Certified Architect program.**

## Solution architecture

Solution architecture is the discipline of formulating a solution to address a particular set of stakeholder needs. The term solution architecture encompasses key decision making for a broader range of solutions, including applications, service solutions, embedded systems, infrastructures, SOA implementation, systems integration, etc.

Solution architects direct the development of a particular solution. They act as the design authorities or chief engineers on a particular project or program. Their domain can span infrastructure, information architecture and business processes.

RCDA focuses on the solution architect role and contains the technology-overarching practices needed to effectively fulfill that role. Its practices have been harvested from CGI's decades of architecting experience and proven ability to deliver high quality solutions.

# RCDA overview

RCDA is CGI's lean, mean and agile solution architecture approach. Within CGI, RCDA is used to design and deliver a wide range of solutions to clients. It consists of a set of principles and practices that guide CGI's solution architects.

RCDA supports architects throughout the entire process of interpreting stakeholder requirements and designing the best-fit solution in a lean, mean and agile manner.

**“RCDA helps us to map out the required quality of IT-based systems in a structured way and provide proper governance to system development.”**

Klaas van der Ploeg  
Architect  
ProRail

## BENEFITS

The application of RCDA brings many advantages to CGI and its clients:

- It smooths communication between solution architects and business stakeholders. RCDA-trained architects communicate about architectural decisions and trade-offs in business terms.
- It creates an environment where architects base design choices on a clear and agreed upon set of architectural requirements using objective and economically oriented trade-offs rather than hypes or personal preferences. RCDA stimulates such an environment by introducing practices that objectify architectural decisions and priorities and put them in a business context.
- It reduces the risk of delayed delivery and budget overruns. RCDA views architecture as a risk and cost management discipline, bringing economic awareness to the design process and avoiding “gold-plating.”

- It enhances the quality of solutions. RCDA practices are CMMI compliant and contain guidance for early and effective evaluation of a solution's quality attributes.
- It creates transparency in solution costing structures. RCDA provides traceability from architectural requirements to the costing model.

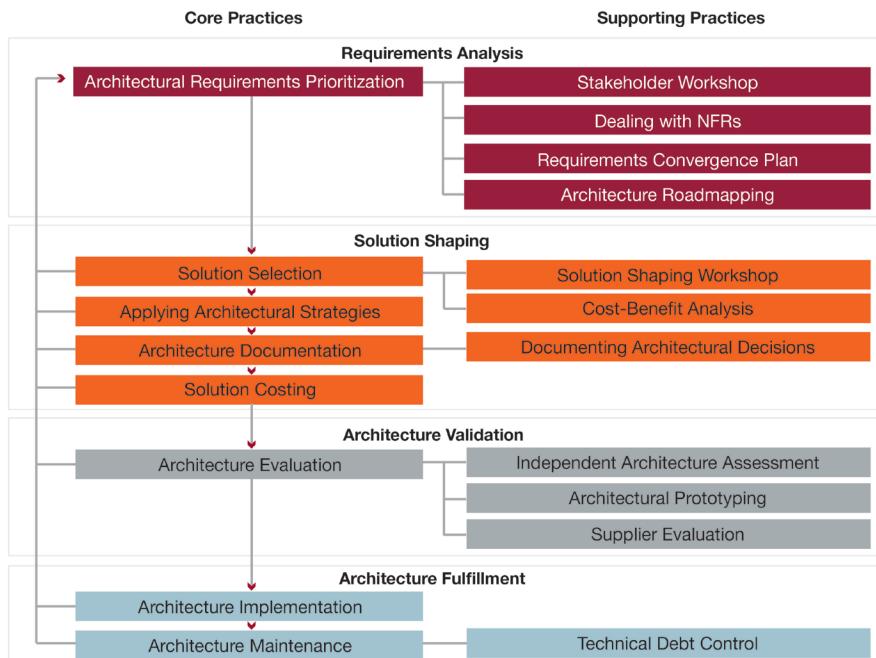
The impact of RCDA on architects' work has been evaluated by surveying architects trained in the approach. An extensive analysis of the results has been published in the *Journal of Systems and Software*<sup>3</sup>. The conclusions of this research are that for the majority of architects, RCDA has significant positive impact on their solution architecting work. This is true for RCDA as a whole—for its principles and for its individual practices.

## LEAN, MEAN AND AGILE

RCDA provides guidance on how to use the appropriate practices for any architecting situation and omit practices that would only add waste, making it a very lean architecting approach. RCDA's focus on risk and cost also makes it mean, enabling architects to focus on what really matters to their stakeholders. In addition, RCDA's workflow uses architectural concerns as a backlog prioritized by risk and cost, making RCDA agile in dealing with change.

## RCDA PRACTICES

RCDA practices are organized into practice sets. Each practice set contains core practices and supporting practices with a related set of objectives:



<sup>3</sup> "RCDA: Architecting as a Risk - and Cost Management Discipline," Eltjo Poort & Hans van Vliet, *Journal of Systems and Software*, 2012, pp.1995-2013.

- In the Requirements Analysis practice set, the requirements originating from the stakeholders are prepared for shaping a solution.
- The Solution Shaping practice set contains practices to define, document and cost a solution's architecture based on driving architectural concerns.
- The Architecture Validation practice set contains practices aimed at validating the architecture developed in previous steps against the stakeholder's needs.
- The Architecture Fulfillment practice set ensures that the architecture developed and validated in previous steps is now actually implemented and maintained in the solution in the most effective way.

Each RCDA practice contains a coordinated set of activities that can be easily integrated within existing design and development processes. Linked together, the RCDA core practices form a powerful CMMI compliant architecting process. RCDA provides guidance on how to select and plan appropriate practices for every situation that requires a solution architecture.

## Conclusion

Solution architects are responsible for the design decisions that have the highest impact on IT-based solutions. Solution architecture is a relatively new discipline. So far, there has been relatively little guidance specifically directed at solution architects; they have found bits and pieces of useful advice in related areas like enterprise architecture, software architecture and IT services design. RCDA is an approach for solution architects that can help fill that void.

RCDA is a solution architecture approach that was developed to close two distinct gaps: the gap between enterprise and software architecture and the gap between architecture and the agile mindset. RCDA combines the extensive scope of enterprise architecture with the pragmatism and agility of modern software development methods.

RCDA contains 8 core practices and 11 supporting practices that have a proven track-record in improving solution architects' effectiveness. RCDA offers especially effective guidance on translating architectural concerns and priorities in business terms like cost, risk and value, enabling architects to communicate more effectively with business stakeholders. The RCDA practices are held together by a powerful set of agile principles and accompanied by extensive guidance on how to apply the approach in various frequently occurring contexts.

Architecture in the digital world is not just a good idea; it is an essential discipline to safeguard the quality and future proofness of modern, complex IT-based solutions. When viewed as a risk and cost management discipline, architecture does not need to obstruct agility. RCDA offers a proven approach to solution architecture that is well-suited to today's agile business needs. CGI offers consultancy, training and tooling to help implement RCDA practices.



North America  
Erik Wynn  
Tel: 613-740-5900  
erik.wynn@cgi.com

UK  
Jeetendra Kumar  
Tel: +44 7900 678508  
jeetendra.kumar@cgi.com

All other countries  
Eltjo Poort  
Tel: +31 88 56 46590  
eltjo.poort@cgi.com



## cgi.com

---

With 68,000 professionals operating in 400 offices across 40 countries, CGI fosters local accountability for client success while bringing global delivery capabilities to clients' front doors. Founded in 1976, CGI applies a disciplined delivery approach that has achieved an industry-leading track record of on-time, on-budget projects. Our high-quality business consulting, systems integration and outsourcing services help clients leverage current investments while adopting new technology and business strategies that achieve top and bottom line results. As a demonstration of our commitment, our average client satisfaction score for the past 10 years has measured consistently higher than 9 out of 10.

---

© 2013 CGI GROUP INC.

All rights reserved. This document is protected by international copyright law and may not be reprinted, reproduced, copied or utilised in whole or in part by any means including electronic, mechanical, or other means without the prior written consent of CGI. The project referenced in this brochure was delivered by CGI.

Whilst reasonable care has been taken by CGI to ensure the information contained herein is reasonably accurate, CGI shall not, under any circumstances be liable for any loss or damage (direct or consequential) suffered by any party as a result of the contents of this publication or the reliance of any party thereon or any inaccuracy or omission therein. The information in this document is therefore provided on an "as is" basis without warranty and is subject to change without further notice and cannot be construed as a commitment by CGI.

---