

Enterprise Architecture for Global Companies in a Digital IT Era

Yoshimasa Masuda · Murlikrishna Viswanathan

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Adaptive Integrated Digital Architecture
Framework (AIDAF)

Yoshimasa Masuda
Carnegie Mellon University in Australia
Adelaide, SA, Australia

Murlikrishna Viswanathan
Carnegie Mellon University in Australia
Adelaide, SA, Australia

and

Keio University
Tokyo, Japan

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Foreword

The challenges in the digital information society are quite difficult but exciting. People are working on them with enthusiasm, tenacity, and dedication to develop new analytical methods and provide innovative solutions to keep up with the latest trends of big data, Internet of Things, cloud computing, mobile IT, etc. In this new age of the digital information society, it is necessary to advocate a new Enterprise Architecture Framework. This book provides state-of-the-art knowledge and practices about Enterprise Architecture Framework beneficial for IT practitioners, IT strategists, CIO, IT architects, and even students and serves as an introductory textbook for all who drive the information society in this era.

Tokyo, Japan

Dr. Jun Murai
Keio University

I found this book to be a very nice contribution to the enterprise architecture community of practice. Congratulations on your development of the AIDAF! Also, it would be helpful to get your views on global trends in the EA community—there are lots of jobs posted for enterprise, solution, data, software, and security architects.

I can recommend this book of “Enterprise Architecture for Global Companies in a Digital IT Era: Adaptive Integrated Digital Architecture Framework (AIDAF)” as a textbook for digital IT strategists/practitioners, EA practitioners, students in universities and graduate schools.

You have done good work! Best of luck in the future.

Pittsburgh, USA

Dr. Scott A. Bernard
Carnegie Mellon University

Preface

First, we clarify the sharing of roles in this book. As a primary author, Dr. Yoshimasa Masuda wrote the whole contents of this book. Dr. Yoshimasa Masuda and Prof. Murli developed the “Questions and Exercises” in the final parts of each chapter. Furthermore, Prof. Murli reviewed this book to enhance this book as the text/reference book suitable for graduate schools and universities worldwide, involving Carnegie Mellon University.

Many global enterprises have encountered various changes, such as the progress of new technologies, globalization, shifts in customer needs, and new business models. Important changes in cutting-edge IT technology with recent developments in Cloud computing and Mobile IT (such as progress in big data technology) have emerged as new trend these days. In global IT industry, CIO’s IT investment is shifting to Cloud/digital platforms largely, toward the next generation of Digital IT, mainly in Europe and USA (Nils Olaya, Jeanne W. Ross, MIT CISR research, 2015). Enterprise Architecture can be effective because it contributes to the design of mid-/large integrated systems, which show a major technical challenge toward the era of Cloud/Mobile IT/Digital IT in digital transformation. On the other hand, in the reality, we had difficulties in starting up Enterprise Architecture with existing EA frameworks in global firm toward a Digital IT.

In the beginning, from standpoints of Digital IT, strategic architecture frameworks (Enterprise Architecture) were investigated. Thereby, existing EA approaches and frameworks did not meet with the direction of shifting to advanced Digital IT areas—Cloud/Mobile IT. Therefore, we recognized a new EA framework for a Digital IT era as the important research theme and task, and we systematized the architecture framework/EA that should suit the direction of advanced Digital IT areas (Cloud/Mobile IT/Digital IT) in consideration of the results of the “EA framework analysis” and the “case study in global enterprise” at this time.

This book aims to investigate solutions incorporated by Architecture Board in the global enterprise for solving issues and mitigating related architecture risks while proposing and implementing “Adaptive Integrated Digital Architecture Framework—AIDAF” and related models and approaches/platforms, which can be applied in companies promoting IT strategy using Cloud/Mobile IT/Digital IT.

This book can be divided into three main parts. The first part consists of Chaps. 1 and 2. These chapters address the background and motivation for the Adaptive Integrated Digital Architecture Framework proposed in this book, to meet with IT strategy toward Cloud/Mobile IT/Digital IT. Chapter 1 is the introduction such as the purpose, scope, and structure of this book that covers the introductions of “the history of information systems toward Digital Transformation” and “Enterprise Architecture.” Chapter 2 explains the background of this book, such as the trend of Digital IT and the direction of Enterprise Architecture. Furthermore, problems in Enterprise Architecture toward the era of Digital IT are shown and countermeasures/solutions are also suggested in this chapter.

The second part of this book comprises Chap. 3. In this chapter, first, the author shows the overview and positioning of strategic architecture framework and related models in the era of Digital IT. Furthermore, we show the necessary elements in EA frameworks for the era of Cloud/Mobile IT/Digital IT and propose the new Enterprise Architecture Framework named “Adaptive Integrated Digital Architecture Framework—AIDAF” and related models for architecture assessment/Risk Management and knowledge management on digital platform, which can solve the problems toward the era of Digital IT described in the previous chapter, while these models and frameworks are applied in companies promoting IT strategy using Cloud/Mobile IT/Digital IT.

The third part of this book demonstrates the application and usefulness of my proposed Enterprise Architecture Framework and several approaches/models related to this Architecture Framework. Three case studies are presented in Chaps. 4, 5, 6, and 7. In Chap. 4, a case study that built and practically implemented our proposed EA framework in a global pharmaceutical company is presented. This case study evaluates the effectiveness and adaptability of my proposed “Adaptive Integrated Digital Architecture Framework—AIDAF” and shows the benefits and results of this EA framework in the era of Cloud/Mobile IT/Digital IT.

Chapters 5 and 6 present two evaluations of this Architecture Framework-related approaches and models. The case study in Chap. 5 is focused on “Architecture Board reviews and knowledge management.” This case study has verified the “Assessment meta-model in Architecture Board,” “Global Digital Transformation Communication model,” and “Solution Collaboration Model” on digital platforms and shows the effectiveness and results of these approaches/models related to my proposed AIDAF. In Chap. 6, the case study is focused on “Risk Management approach for Digital Transformation” and Big Data. That case study evaluated the “Strategic Risk Management model for Digital Transformation,” clarified the strategy elements to mitigate risks in Digital Transformation, and showed results of this approach/model related to my proposed AIDAF. Furthermore, Chap. 7 presents the overall evaluation of AIDAF and the perspectives for AIDAF and related approaches/models.

Chapter 8 presents the conclusion and some important points from this research. This chapter summarizes the results of verifying my proposed Architecture Framework—AIDAF—and related approaches/models and shows important points

of this Adaptive Integrated Digital Architecture Framework—AIDAF—and the related approaches/models.

Chapter 9 presents the future direction of the AIDAF and Internet of Things. This chapter introduces and briefs the direction and concept of the research initiative named “Open Healthcare Platform 2030,” for the above purpose.

Adelaide, Australia/Tokyo, Japan
Adelaide, Australia

Yoshimasa Masuda
Murlikrishna Viswanathan

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We would like to thank our advisors and colleagues in the field of digital and Enterprise Architecture in writing *Enterprise Architecture for Global Companies in a Digital IT Era*.

Through our research and working experience in starting up Enterprise Architecture in the global company, the problems toward Digital IT have enhanced my motivation and attention, which can lead to our selection of a research topic for this book without hesitation. Besides, our research would have been difficult without the devoted supports of the following people.

Recommendations from Scott Bernard and Jun Murai are precious contributions to this book. Scott Bernard has worked as the US Federal Chief Enterprise Architect with the President's Office of Management and held as CIO positions while teaching EA in Carnegie Mellon University. Jun Murai is Founder of JUNET starting Internet in Japan and known as "the father of Internet in Japan" while teaching Information Technology at Keio University.

Moreover, especially we would like to also express our great appreciation to Prof. Riaz Esmailzadeh in Carnegie Mellon University, Australia, for their willingness to become external advisors for our research and the book. His advice and suggestions are very precious in terms of enterprise architecture, information system architecture, and digital transformation as well as managerial aspects.

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Contents

1	Introduction	1
1.1	An Overview of Digital Transformation and Enterprise Architecture	1
1.2	The Purpose and Scope of This Research	4
1.3	The Primary Related Research	5
1.3.1	Histories and State-of-the-Art Progress in Architecture Frameworks	5
1.3.2	Alternative Approaches to Enterprise Architecture—The MIT Approach	9
1.3.3	Service-Oriented Enterprise Architecture Evolution Model	11
1.3.4	Adaptive Enterprise Architecture Framework	12
1.4	Book Structure	12
	References	15
2	Direction of Digital IT and Enterprise Architecture	17
2.1	Introduction for Directions of Digital IT and Enterprise Architecture	17
2.2	Directions of Cloud/Mobile IT	19
2.2.1	Cloud Architecture	19
2.2.2	SOA and Microservices	20
2.3	Specific Application Layer on Cloud/Mobile IT—Big Data, Internet of Things	22
2.3.1	Big Data	22
2.3.2	Internet of Things (IoT)	24
2.4	EA Frameworks—TOGAF, FEAF, Adaptive EA, etc.—With the Integration of Cloud/Mobile IT	27
2.4.1	TOGAF (The Open Group Architecture Framework)	27
2.4.2	Federal Enterprise Architecture Framework (FEAF)	29
2.4.3	Department of Defense Architecture Framework (DoDAF)	30

2.4.4	MODAF (British Ministry of Defence Architecture Framework)	31
2.4.5	Adaptive Enterprise Architecture Framework	32
2.4.6	EA ³ Cube Framework	34
2.5	EA Framework Analysis	36
2.5.1	Comparison of Mobile IT/Cloud Integration in EA Frameworks	36
2.5.2	Analysis of Cloud/Mobile IT Integration in EA Frameworks	38
2.5.3	Results of EA Framework Analysis	40
2.6	Agile Enterprise Architecture and Scaling Agile Frameworks	41
2.6.1	Agile Enterprise Architecture	41
2.6.2	Scaling Agile Frameworks	42
2.7	Problems and Solutions	51
2.7.1	Problems' Structure and Their Factors in Digital Transformation and Enterprise Architecture	51
2.7.2	Solutions to Cope with Problems in Digital Transformation and Enterprise Architecture	55
	References	56
3	Strategic Architecture Framework Aligned with IT Strategy	
	Promoting Cloud/Mobile IT/Digital IT	61
3.1	Overview of Strategic Architecture Framework in the Era of Digital IT (AIDAF-Covering-Related Models)	61
3.1.1	Overview and Positioning of AIDAF and Related Models	61
3.1.2	Research Strategy	64
3.2	Necessary Elements and Requirements in EA Frameworks for the Era of Cloud/Mobile IT/Digital IT	65
3.2.1	Necessary Elements in Enterprise Architecture Framework for the Era of Cloud/Mobile IT/Digital IT	65
3.2.2	Documentation Artifacts in EA Frameworks	67
3.2.3	Requirements in Enterprise Architecture Framework for the Era of Cloud/Mobile IT/Digital IT	69
3.3	Adaptive Integrated Digital Architecture Framework—AIDAF . . .	70
3.3.1	Proposal of Adaptive Integrated Digital Architecture Framework—AIDAF	70
3.3.2	Research Methodology	71
3.4	Assessment Meta-Model in Architecture Board	72
3.4.1	Background	72
3.4.2	Architecture Board and Global Healthcare Company Case	72

3.4.3	Proposal of Assessment Meta-Model in Architecture Board	74
3.4.4	Research Methodology	75
3.5	GDTC Model for Knowledge Management on Digital Platforms	75
3.5.1	Background	75
3.5.2	Research Methodology for Global Communication Process on Digital Platforms	79
3.5.3	GDTC Model Overview	80
3.5.4	Proposal of GDTC Model for Global Communication on Enterprise Portal	81
3.6	Social Collaboration Model for Architecture Review in Architecture Board	82
3.6.1	Proposal and Overview of Social Collaboration Model for Architecture Review in Architecture Board	82
3.6.2	Research Methodology for Social Collaboration Model for Architecture Review in Architecture Board	83
3.7	STRMM for Digital Transformation	84
3.7.1	Proposal of STRMM for Digital Transformation	84
3.7.2	Research Methodology	84
	References	86
4	Evaluation for EA Framework Implementation Method	89
4.1	Case of EA Framework Building in a Global Pharmaceutical Company	89
4.1.1	Building an EA Framework Through TOGAF at Japan Headquarters	90
4.1.2	Problems with EA Implementation in Cloud/Mobile IT/Digital IT Strategy	91
4.1.3	Building and Application of an “Adaptive Integrated Digital Architecture Framework—AIDAF” in Global Deployment of EA	92
4.2	Evaluation and Analysis of Case Study	95
4.3	Summary	97
	References	98
5	Evaluation of Architecture Board Review Process with Knowledge Management	99
5.1	Case of “Architecture Board Review” in Global Healthcare Company	99
5.2	Evaluation and Analysis of Case Study for Architecture Board Review	102
5.2.1	Data Analysis	102
5.2.2	Evaluation and Analysis, Results	104

5.3	Global Communication Case Study	107
5.3.1	Enterprise Portal	107
5.3.2	Global Communication Case Study	110
5.4	Verifications and Summary	110
5.4.1	Verifying the Research Hypotheses in Global Communication Case Study	110
5.4.2	Verifying SCM Model for Architecture Review in Architecture Board with the Global Communication Case Study	112
	References	116
6	Evaluation for Risk Management Approach for Digital Transformation	117
6.1	Case of “Risk Management with Architecture Board” in GHE	117
6.2	Evaluation and Analysis of Case Study	119
6.2.1	Data Analysis—Risk Categories for Digital IT Areas	119
6.2.2	Data Analysis—Solution Categories for Digital IT Areas	120
6.2.3	Interrelation Between Solutions and Risks for Digital IT	121
6.3	Verifications and Summary	123
6.3.1	Cloud/Mobile IT with STRMM Model	123
6.3.2	Specific Application Layer on Cloud/Mobile IT—Big Data with STRMM Model	125
6.3.3	Strategy Elements to Mitigate Risks in Digital Transformation	126
	References	126
7	Overall Evaluation and Perspectives	129
7.1	Overall Evaluation	129
7.1.1	Valuation of AIDAF for Agility-Related Elements	129
7.1.2	Valuation of Strategy Elements to Mitigate Risks in Digital Transformation	132
7.2	Perspectives on AIDAF	134
7.2.1	Benefits of EA Implementation Using the “Adaptive Integrated Digital Architecture Framework—AIDAF”	134
7.2.2	Challenges Encountered in EA Implementation of AIDAF	135
7.2.3	Critical Success Factors for Implementing AIDAF in the Era of Cloud/Mobile IT/Digital IT	136
7.2.4	Intermediary Knowledge with GDTCC Model in Architecture Board	137
7.2.5	Global Communication Structure in Architecture Board	138

7.2.6	Challenges in Architecture Board Formulation Toward the Era of Digital IT	139
7.2.7	Critical Success Factors for Formulating Architecture Board in the Era of Digital IT	139
7.2.8	Global Architecture Board Activities for Digital Transformation	140
7.2.9	Limitations	141
	References	142
8	Conclusion	143
8.1	Adaptive Integrated Digital Architecture Framework—AIDAF . . .	143
8.2	Architecture Review and Global Communication Process on Digital Platforms	144
8.3	Risk Management for Digital Transformation	145
8.4	Future Research	146
9	Future Direction—Open Healthcare Platform 2030 and IoT Healthcare Platform	147
9.1	Research Direction and Research Methodology in OHP2030	147
9.2	AIDAF Application for Cross-Functional Healthcare Community	148
9.3	Healthcare Community Case in OHP2030	148
9.4	Challenges in OHP2030	149
9.5	Final Thoughts for OHP2030	150
	References	151
	Bibliography	153

Abbreviations

AA	Application Architecture
ADM	Application Development Method
AGATE	Atelier de Gestion de l'ArchiTEcture des systèmes d'information et de communication—An Architecture Framework for modeling computer or communication systems architecture for French Defence and military
AIDAF	Adaptive Integrated Digital Architecture Framework
API	Application Programming Interfaces—key element for digital transformation because of an essential component in Microservices, merging the old and the new IT platforms
AUSDAF	Australian Defence Architecture Framework
BA	Business Architecture
BI	Business Intelligence
BPR	Business Process Redesign/Reengineering
C4ISR	Command, Control, Communication, Computer and Intelligence, Surveillance, Reconnaissance
CAFEA	Common Approach to Federal Enterprise Architecture
CIO	Chief Information Officer
CISO	Chief Information Security Officer
CMC tools	Computer-mediated communication tools
CMMI	Capability Maturity Model Integration
COBIT	Control Objectives for Information and Related Technology
CRM	Customer relationship management
DA 2.0	Disciplined Agile 2.0
DA	Data Architecture
DoDAF	Department of Defence Architecture Framework
EIS	Enterprise Information Systems
ERP	Enterprise Resource Planning
FEAF	Federated Enterprise Architecture Framework
GDTC	Global Digital Transformation Communication model

GHE	Global Healthcare Enterprise
GxP	Good x Practice (validation)
IaaS	Infrastructure as a Service
IE	Internet Explorer (Microsoft)
IIS	Internet Information Services (standard Web services for Microsoft Windows)
JDBC	Java Database Connectivity
KOL	Key opinion leaders (management)
LAN	Local area network
LeSS	Large-Scale Scrum
LOBs	Lines of business
MDM	Master data management (platform)
MIT CISR	Massachusetts Institute of Technology—Center for Information Systems Research
MIT EA	Massachusetts Institute of Technology—Enterprise Architecture approach
MOD	Ministry of Defence (UK)
MODAF	British Ministry of Defence Architecture Framework
MVS	Multiple Virtual Storage (operating system for IBM mainframe)
NIST	National Institute of Standards and Technology (USA)
OASIS	The Organization for the Advancement of Structured Information Standards
ODBC	Open Database Connectivity
ONM	Organizational network model
PaaS	Platform as a Service
PMO	Project management office
POS	Point of Sale
SaaS	Software as a Service
SAFe	Scaled Agile Framework
SCM	Supply Chain Management
SCM model	Social Collaboration Model
SDLC	System (Software) Development Life Cycle (process)
SNS	Social networking service
SOA	Service-oriented architecture
SoS	Scrum of Scrum
STRMM	STrategic Risk Mitigation Model
TA	Technology Architecture
TOGAF	The Open Group Architecture Framework (EA)
TRM	Technology Reference Model
VM	Virtual Machine (operating system for IBM mainframe)
VSE	Virtual Storage Extended (operating system for IBM mainframe)
WAN	Wide area network
WWW	World Wide Web