12 MORE ESSENTIAL SKILLS FOR SOFTWARE ARCHITECTS

Dave Hendrickson

FREE SAMPLE CHAPTER

SHARE WITH OTHERS
12 MORE ESSENTIAL SKILLS FOR SOFTWARE ARCHITECTS
12 MORE ESSENTIAL SKILLS FOR SOFTWARE ARCHITECTS

DAVE HENDRICKSEN

Addison-Wesley
Upper Saddle River, NJ • Boston • Indianapolis • San Francisco
New York • Toronto • Montreal • London • Munich • Paris • Madrid
Capetown • Sydney • Tokyo • Singapore • Mexico City
To my wife, Jennifer, my son, Tim, and my daughter, Katie.
This page intentionally left blank
CONTENTS

Preface xix
Acknowledgments xxiii
About the Author xxv

Part I: Project Skills 1

Chapter 1: Partnership 5
What Is a Partnership? 6
What Are the Key Aspects of a Partnership? 6
Alignment 6
With Whom Do I Need to Be Partners? 7
Finding the Thought Leaders 9
Knowing the Influencers 10
Establishing Trusted Adviser(s) 10
Community Review (Architecture Review Board) 10
Seeking Alignment before Making Key Decisions 11
Alignment of a Shared Vision Enables Partnerships 11
Trust 12
Establishing Trust 12
Establishing Open Disclosure 12
Avoiding Getting Spread Too Thin (Overcommitting) 13
How to Unwind after You Have Overcommitted 14
Learning to Say No 15
Trust Enables Transparency—the Lifeblood of Partnerships 16
Context 17
Realizing the Nature of the Partnership 17
Being Aware of Your Business Context 18
Technical Decisions Require Partnerships 18
Key Point: Technical Decisions Are Political Decisions 19
Presenting the Situation First (Give Context) 19
Having Your Partners’ Backs 20
<table>
<thead>
<tr>
<th>Chapter 2: Discovery</th>
<th>29</th>
</tr>
</thead>
<tbody>
<tr>
<td>What Is Discovery?</td>
<td>30</td>
</tr>
<tr>
<td>The Keys to Discovery</td>
<td>30</td>
</tr>
<tr>
<td>Understanding the Customer</td>
<td>32</td>
</tr>
<tr>
<td>Partnering with Sales, Marketing, and New Product Development</td>
<td>32</td>
</tr>
<tr>
<td>Meeting with Customers</td>
<td>37</td>
</tr>
<tr>
<td>What Will Delight the Customer?</td>
<td>43</td>
</tr>
<tr>
<td>Understanding the Market</td>
<td>43</td>
</tr>
<tr>
<td>Learning about the Customers’ Customers</td>
<td>46</td>
</tr>
<tr>
<td>Where Are the Customers Willing to Spend Money?</td>
<td>47</td>
</tr>
<tr>
<td>What Is the Competition Doing?</td>
<td>48</td>
</tr>
<tr>
<td>Listening to Themes across Customers</td>
<td>50</td>
</tr>
<tr>
<td>Understanding Your Business</td>
<td>51</td>
</tr>
<tr>
<td>Learning What Your Business Wants to Do</td>
<td>52</td>
</tr>
<tr>
<td>Personalizing Your Company’s Strategic Goals</td>
<td>52</td>
</tr>
<tr>
<td>Developing a Business Context for Decision Making</td>
<td>52</td>
</tr>
<tr>
<td>Summary</td>
<td>53</td>
</tr>
<tr>
<td>References</td>
<td>53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter 3: Conceptualization</th>
<th>55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation</td>
<td>56</td>
</tr>
<tr>
<td>Getting Involved Early</td>
<td>57</td>
</tr>
<tr>
<td>Conceptualization: Bringing Ideas to Life</td>
<td>58</td>
</tr>
</tbody>
</table>
## Concept Formation
- What Language Are They Speaking? 59
- What Problem Is Being Discussed? 60
- When Arriving Late to the Ideation Party, Be Cautious about Committing 62
- What Does This Concept Look Like? 63

## Concept Reification
- Minimum Viable Product 67
- The Need for Experimentation 68
- Establishing Assumptions Can Help Harmonize the Vision 68
- Establishing Essential Capabilities and Customer Roles 69
- Reify with Customers 70

## Concept Evolution
- Being a Student of History 71
- Embracing Multiple Perspectives 72
- Seeking Conceptual Integrity 73
- Recognizing Adjacent Opportunities 75

## Summary
75

## References
76

## Chapter 4: Estimation
79

### Estimates Overview
- What Is the Purpose of the Estimate? 80
- Is There an Established Project Context? 82
- What Is an Architectural Approach? 82

### Understanding the Estimating Process
- Estimating Pipeline 84
- Types of Projects 85
- Alternative Ways of Financing Projects 86
- Understanding the Business Process 87

### Developing the Architectural Approach
- Is This a Partnership or a Contractual Relationship? 88
- What Is the Business Rationale for the Project? 89
- What Is the Marketing Approach? 89
- Is This a Repeat Estimate? 90
- Are You Building a Platform? 93
- Are You Re-platforming? 93
- What Technologies Are in Play? 94
- What Is the Organizational Structure? 95
- Do You Need to Seek External Research? 96
- Have You Identified Leverageable Components? 96
### Estimating Strategies
- Plan for Unknowns and Challenges  
- Be Realistic: Don’t Cave In Just to Get the Project  
- Keep the Critical Things Close  
- Develop Estimating Feedback Loops  
- Minimize Organization Coupling and Cohesion  
- PowerPoint as You Go  
- Develop Checklists  
- Gain Executive and Organization Buy-in Early

### Estimating Principles
- Know the Hard Problem  
- Provide Options  
- Leave Design Decisions Open  
- Know the Schedule  
- Know What You Want  
- Avoid Being Negative  
- Seek Opportunities to Say Yes  
- Bargain Hard Now, Not Later  
- Don’t Cave In  
- Trust Your Gut Feeling  
- Beware of Projects That Others Have Estimated  
- Know the Business’s Targeted Build Price

### Bringing It All Together
- Knowing Your Timeline  
- Who Is Involved with Estimating?  
- Understanding Your Leverage Points  
- Putting It All Together  
- Engaging Executives  
- Selling the Estimate

### Summary

### References

---

### Chapter 5: Management

#### Architecture Management Defined
- Areas of Architectural Responsibility  

#### Striving toward Technology Excellence
- Establishing a Vision  
- Raising Awareness of Technical Debt and Funding the Right Solution  
- Keeping the Technical Environment Interesting  
- Finding Potential Patents  
- Seeking Data Center and Operations Support for Your Direction
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generalizing the Solution</td>
<td>115</td>
</tr>
<tr>
<td>Making It Strategic</td>
<td>115</td>
</tr>
<tr>
<td>Leveraging Solutions</td>
<td>115</td>
</tr>
<tr>
<td>Delivering Projects</td>
<td>116</td>
</tr>
<tr>
<td>Partnering with the Project Manager</td>
<td>116</td>
</tr>
<tr>
<td>Eliminating Dependencies Ruthlessly</td>
<td>116</td>
</tr>
<tr>
<td>Managing Expectations</td>
<td>116</td>
</tr>
<tr>
<td>Mastering the Development Process</td>
<td>117</td>
</tr>
<tr>
<td>Being Where the Problems Are</td>
<td>118</td>
</tr>
<tr>
<td>Being Aware of Nontransparency on Your Projects</td>
<td>118</td>
</tr>
<tr>
<td>Limiting the Number of Contractors in Leadership Positions</td>
<td>119</td>
</tr>
<tr>
<td>Providing Technical Management (Areas of Responsibility)</td>
<td>119</td>
</tr>
<tr>
<td>Managing by Walking Around</td>
<td>120</td>
</tr>
<tr>
<td>Resolving Issues</td>
<td>121</td>
</tr>
<tr>
<td>Asking the Tough Questions</td>
<td>121</td>
</tr>
<tr>
<td>Dealing with Problems in the Moment</td>
<td>121</td>
</tr>
<tr>
<td>Saying No, but with Options</td>
<td>122</td>
</tr>
<tr>
<td>Striving to Be Consistent in Your Decisions</td>
<td>122</td>
</tr>
<tr>
<td>Learning to Deal with Things Head-on, Cards Faceup on the Table</td>
<td>124</td>
</tr>
<tr>
<td>Knowing What You Are Willing to Cave On When Negotiating</td>
<td>124</td>
</tr>
<tr>
<td>Being Willing to Challenge Areas You Don’t Agree with (Respectfully)</td>
<td>124</td>
</tr>
<tr>
<td>Knowing What Is Not Your Problem</td>
<td>125</td>
</tr>
<tr>
<td>Partnering with Executives</td>
<td>125</td>
</tr>
<tr>
<td>Managing Risk through Transparency</td>
<td>125</td>
</tr>
<tr>
<td>Reviewing Estimates</td>
<td>126</td>
</tr>
<tr>
<td>Limiting the Number of Boxes on Diagrams</td>
<td>126</td>
</tr>
<tr>
<td>Raising Technology Awareness</td>
<td>126</td>
</tr>
<tr>
<td>Having Your Boss’s Back</td>
<td>127</td>
</tr>
<tr>
<td>Avoiding Interrupting Executives When They Are Talking</td>
<td>127</td>
</tr>
<tr>
<td>Managing Your Time</td>
<td>127</td>
</tr>
<tr>
<td>Limiting the Number of Projects to Which You Commit</td>
<td>128</td>
</tr>
<tr>
<td>Defining Your Role and Bounding It</td>
<td>128</td>
</tr>
<tr>
<td>Prioritizing Where to Engage Your Time</td>
<td>128</td>
</tr>
<tr>
<td>Learning to Make Decisions on Limited Data and with Limited Time</td>
<td>130</td>
</tr>
<tr>
<td>Attending Meetings Only If You Are an Active Participant</td>
<td>130</td>
</tr>
<tr>
<td>Getting a Deadline</td>
<td>130</td>
</tr>
</tbody>
</table>
## Bringing It All Together

- Summary
- References

## Chapter 8: Governance

- Governance Defined
- Governance Principles
  - Avoid Vendor Lock-in
  - Encourage Open-Source Usage
  - Minimize the Cost of Disruption (aka Enable Business Continuity Planning and Disaster Recovery)
  - Enable Loose Coupling between Business Units
  - Leverage Common Capabilities
  - Ensure Regulatory Compliance
  - Ensure Security
  - The Principle of Least Privilege (aka the Principle of Least Authority)
  - Seek Unified Identity and Access Management
  - Seek Data Portability (aka Avoid Data Lock-in)
  - Seek Integration and Automation
- Areas of Governance
  - Estimates
  - Management Concerns
  - Architecture
  - Design
  - Building, Coding, Integrating, Deploying, Testing, and Monitoring
- Governance and a Healthy Tension with Agile

## Chapter 9: Know-how

- Know-how Defined
- Developing Know-how
  - Developing Know-how Relevance
  - Developing Know-how Currency
  - Developing Know-how Excellence
- Know-how Synthesis
- Know-how-Driven Architecture

## References
Part III: Visionary Skills

Chapter 10: Technology Innovation

Technology Innovation Defined 238
Trend Awareness 238
Areas of Trend Awareness 240
Applying Trend Awareness 241
Business Alignment 242
Paying Attention to Trends on Customer Inquiries 242
Getting Customer Feedback 242
Analyzing Customer Feedback 243
When to Be Cautious about Trends 243
When to Embrace a Trend 245
Strategic Research 245
Research Approaches 246
Technology Innovation Principles 247
Seek Approved but Minimal Time and Funding to Explore 247
Make Small Bets 248
Use Technology Scouting to Scan and Track the Trends Regularly 248
Have a Lab Area 249
Use Rapid Experimentation with User Feedback Loops 250
Show the Business and Customers Prototypes 250
Introduce New Technologies at the Edge 250
Pragmatic Technology Innovation 252
Summary 253
References 254

Chapter 11: Strategic Roadmapping

Strategic Roadmapping Defined 256
Elements of a Strategic Roadmap 257
Strategically Focused 257
Time Sequenced 257
Organized by Swim Lanes 257
Dependency Aware 257
Visually Represented 258
Collaborative in Nature 258
Code Named 258
Context Dependent (Personalized) 258
Multidisciplinary and Specialized 258
Prioritized 259
Iterative in Nature 259
Updated 259
Published 259
Measurable 259
Roadmapping Strategies 260
   Whiteboarding the Roadmap Using Sticky Notes 260
   Starting with the End (aka Work Backward) 260
   Holding Workshops 260
   Thinking of Roadmapping as a Project 261
   Capturing Underlying Guiding Principles 261
Roadmapping Principles 261
   Keep It Simple 261
   Partner with the Business 262
   Get Moving 262
   Have Fun 262
   Strategies without Goals Are Pointless 262
   Identify Areas That Require Research and Innovation 263
   Identify Skill and Knowledge Gaps 263
   Be Flexible on the Timing of Getting to the Destination 263
   Be Willing to Take a New Route 263
   It’s Not about the Details; Focus on the Destination and Key Milestones 264
   Follow What Energizes You 265
What Is an Architect’s Role in Roadmapping? 265
Where Can You Use Roadmaps? 266
Roadmap Considerations 266
Roadmap Socialization 268
Celebrating Milestones Achieved 269
Summary 269
References 270

Chapter 12: Entrepreneurial Execution 271
Entrepreneurial Execution Defined 272
Elements of Entrepreneurial Execution 272
   Entrepreneurial Spirit 274
   Calculated Risk Taking 275
   Delivering Results 276
Entrepreneurial Execution Principles 276
   Affordable Loss Principle 276
   Lemonade Principle 276
   Patchwork Quilt Principle 277
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird-in-the-Hand Principle</td>
<td>277</td>
</tr>
<tr>
<td>Pilot-in-the-Plane Principle</td>
<td>277</td>
</tr>
<tr>
<td>Seize the Moment</td>
<td>278</td>
</tr>
<tr>
<td>Follow Your Passion</td>
<td>278</td>
</tr>
<tr>
<td>Learn to Pivot</td>
<td>279</td>
</tr>
<tr>
<td>Learn by Doing (Making Mistakes), but Do It</td>
<td>280</td>
</tr>
<tr>
<td>Cost-Effectively</td>
<td></td>
</tr>
<tr>
<td>Seek Feedback</td>
<td>281</td>
</tr>
<tr>
<td>Seek Leverage</td>
<td>282</td>
</tr>
<tr>
<td>Architecting with Entrepreneurial Execution</td>
<td>283</td>
</tr>
<tr>
<td>Summary</td>
<td>284</td>
</tr>
<tr>
<td>References</td>
<td>284</td>
</tr>
<tr>
<td>Epilogue: Bringing It All Together</td>
<td>287</td>
</tr>
<tr>
<td>Thinking about Skill Development</td>
<td>288</td>
</tr>
<tr>
<td>Final Thought</td>
<td>289</td>
</tr>
<tr>
<td>Index</td>
<td>291</td>
</tr>
</tbody>
</table>
This page intentionally left blank
“Architecture is not a profession for the faint-hearted, the weak-willed, or the short-lived.”

—Martin Filler

“Architecture and building is about how you get around the obstacles that are presented to you. That sometimes determines how successful you’ll be: How good are you at going around obstacles?”

—Jeremy Renner

“Architecture is a service business. An architect is given a program, budget, place, and schedule. Sometimes the end product rises to art—or at least people call it that.”

—Frank Gehry

“Architecture is invention.”

—Oscar Niemeyer

“I loved logic, math, computer programming. I loved systems and logic approaches. And so I just figured architecture is this perfect combination.”

—Maya Lin

“I think about architecture all the time. That’s the problem. But I’ve always been like that. I dream it sometimes.”

—Zaha Hadid

“The Internet is probably the most important technological advancement of my lifetime. Its strength lies in its open architecture and its ability to allow a framework where all voices can be heard.”

—Adam Savage
BOOK MOTIVATION

This book and my first book (12 Essential Skills for Software Architects) focus on the skills needed to become a successful software architect.

Software architecture is about learning how to relate to people and learning how to think about things with an eye toward architecture. 12 Essential Skills for Software Architects focused on soft skills; without these, the rest of the journey is nearly impossible.

Shortly after I completed my first book, I began receiving questions about the assumed technical skills (shown in Figure P.1) that are referred to but not discussed.

This book dives into the details of those assumed skills—the technical skills you need on a daily basis in the role of an architect. It is the combination of soft and technical skills that will enable you reach your goals.

**Figure P.1** Twelve essential skills for software architects
BOOK GOALS

My goals for this book are to

- Enable excellence in software architecture through skills development
- Enable architectural success in a business context
- Promote an architectural approach for thinking about the enterprise

BOOK ORGANIZATION

The format and style of this book are intended to help evoke critical thinking about your specific set of projects, your areas of architectural oversight, and your areas of direction-setting leadership. These take the form of project skills, technology skills, and vision skills.

These three areas are organized as follows:

- **Part I: Project Skills.** These skills enable you to drive projects from early ideation to project delivery through
  - Partnership (Chapter 1)
  - Discovery (Chapter 2)
  - Conceptualization (Chapter 3)
  - Estimation (Chapter 4)
  - Management (Chapter 5)
- **Part II: Technology Skills.** These skills ensure that the right technologies are built, bought, or leveraged through
  - Platform Development (Chapter 6)
  - Architectural Perspective (Chapter 7)
  - Governance (Chapter 8)
  - Know-how (Chapter 9)
- **Part III: Visionary Skills.** These skills enable the pursuit of the business’s long-term competitive vision through
  - Technology Innovation (Chapter 10)
  - Strategic Roadmapping (Chapter 11)
  - Entrepreneurial Execution (Chapter 12)

The three parts can be thought of as a layered set of skills for software architects (see Figure P.2). Each layer is the basis for the layer above it.
Each of the chapters within the book is written to be read independently of the other chapters. This independence should enable you to read the book in the order of your interests or needs.

I hope you enjoy reading the book and that you learn some new things that will enable you to become an excellent architect and better understand the role of an architect.

If you have any questions or comments, please feel free to contact me at dave@hendricksen.org.
ACKNOWLEDGMENTS

I would like to say thank you to the excellent staff at Addison-Wesley, specifically Olivia Basegio, Sheri Cain, Chris Guzikowski, Chuti Prasertsith, Kesel Wilson, and Barbara Wood. They have been absolutely fantastic to work with.

I would like to thank Brad Appleton, Kevin Bodie, Robert Maksimchuk, and one reviewer who chose to remain anonymous for reviewing my first draft of the book. They all gave me great feedback.

I would also like to thank the following reviewers from Thomson Reuters: Mick Atton, Dan Bennett, Cary Felbab, Scott Francis, Kevin Hakanson, Jesse Haraldson, James Jarvis, Andrew Lipstein, Andrew Martens, Lynn Meredith, Scott Post, Noah Pruzek, Chris Rowland, Bob Sturm, Bas Vellekoop, and Justin Wright. Each of them reviewed selected chapters in their areas of expertise.

In addition, I would like to say thank you to my wife, Jennifer, and son, Tim, for reviewing the book.

Finally, I would like to say thank you to my family and parents for their patience and support while I wrote this second book.
This page intentionally left blank
My name is Dave Hendricksen, and I am a Big Data architect for Thomson Reuters. These days I spend most of my time working on big data-related projects that span Thomson Reuters. I have also worked on WestLawNext (an online legal research tool), Optimus (a learning platform), and a wide variety of other projects, generally focused on new product development—I love to innovate. I also help run and organize an architecture mentorship program and a technology forum at Thomson Reuters.

Every day is busy and challenging; for me that equates to fun and engaging.

I have been married for 25 years to a beautiful lady. We have two great kids, one cat, one dog, and a koi pond. We have some lake property—it seems as if that’s a requirement when you live in Minnesota, the Land of Ten Thousand Lakes. It is also the location of summertime building projects: trebuchet, go-cart, rain barrel water collection system, robotic lawn mower, and so on.

In a similar vein, I spend a fair amount of time mentoring the Eagan High School FIRST Robotics Team. We try to run our program like a small business—we need to raise money, market our team, build a product, and compete in tournaments.

Being the lead mentor for a large robotics team (more than 80 kids and more than 30 mentors) has many parallels to being an architect on large-scale development projects. There are a wide variety of opinions of what should be done, limited resources, limited time, and you need to deliver a successful product.

In short, I love to plan, research, organize, teach, mentor, architect, and build things.
Chapter 10

TECHNOLOGY INNOVATION

“Innovation is the central issue in economic prosperity.”

—Michael Porter

“Innovation has nothing to do with how many R & D dollars you have. When Apple came up with the Mac, IBM was spending at least 100 times more on R & D. It’s not about money. It’s about the people you have, how you’re led, and how much you get it.”

—Steve Jobs

“Because, you know, resilience—if you think of it in terms of the Gold Rush, then you’d be pretty depressed right now because the last nugget of gold would be gone. But the good thing is, with innovation, there isn’t a last nugget. Every new thing creates two new questions and two new opportunities.”

—Jeff Bezos

“I believe in innovation and that the way you get innovation is you fund research and you learn the basic facts.”

—Bill Gates

“Learning and innovation go hand in hand. The arrogance of success is to think that what you did yesterday will be sufficient for tomorrow.”

—William Pollard

Have you ever been at a conference and attended a really cool presentation? It focused your attention on a new area you were not familiar with, and it captured your interest. Later in the week, you noticed more sessions that were focused on different perspectives of the same technology or approach.

This kind of clustering of conference presentations—or magazine articles or blog posts—is usually a signal that a new trend is emerging. It may not have wide appeal yet, and it may not emerge into anything concrete, but it
sounds fascinating and seems to address a real issue you are dealing with. Your ability to recognize these types of new trends can open up opportunities for your business and enable you to be a leader in the implementation of a new technology within your organization. On the other hand, the new opportunity could lead you down a rabbit hole with technology that has little support or interest from the wider development community internally or externally.

This chapter unveils one of the essential skills needed by a software architect: the ability to identify, assess, and infuse new and potentially disruptive technologies in a business-centric fashion.

**Technology Innovation Defined**

*Technology innovation* is the ability to

- Look where research, technology, and your industry are heading
- Identify trends and opportunities that are aligned with your business’s strategic goals and objectives
- Partner with the business and customers to discover solutions
- Make recommendations about the adoption of new technologies into the organization and their timing

Technology innovation is linked to the theory of Moore’s Law, which predicts the doubling of computing hardware capacity every two years. Many digital devices are impacted by Moore’s Law as processing power, memory, and other technical capabilities improve over time, speeding exponential growth and technology innovation.

Technology innovation is best done in partnership with the business to align with the company’s strategies and goals. It also helps ensure that technologies are not selected simply for their “cool” factor (see Figure 10.1).

**Trend Awareness**

*Trend awareness* is your window into where interesting technologies are heading. It provides you with a glimpse of the possible new disruptive technologies, business models, processes, and so on that can either give you a leg up on the competition or put you at a disadvantage.

The trend diagram in Figure 10.2 shows the typical peaks and valleys in popularity that new technologies tend to follow over time. Observing the
Trend Awareness

Strategic Research Business Alignment

Technology Innovation is driven by

Figure 10.1 Technology innovation

Time

Introduction

Obscurity

Early Awareness

Mass Awareness

Popularity

Figure 10.2 Trend diagram
popularity of technologies, business models, processes, and related areas can give you a good sense of what is happening in the industry at the macro scale. Companies such as Gartner, GigaOM, and Forrester Research typically gather and publish this kind of information on technology topics such as big data, mobile, gamification, and others as they start to gain critical mass and awareness.

Your ability to quickly identify promising new technology trends and predict their eventual success or failure will help you avoid spending time and resources on those technologies that end up toiling in obscurity and eventual failure.

Areas of Trend Awareness
A wide variety of trends are potentially applicable to your architectural areas of responsibility and should be observed on a regular basis. These include the following:

- **Industry.** What are the economic conditions that affect your industry? Is it in a cycle of growth, stability, or decline? The economics that are pervasive in your industry can and will affect the degree to which you will be able to attract technology investment from the business.

- **University research.** What areas are universities researching that may be of interest to your business and lead to potential partnerships? Knowing what schools are doing in research areas that are of interest to your business partners can be a great source of new information and talent in the form of interns and new hires as well as an area for potential joint research projects.

- **Open-source tools.** What tools and technologies are gaining or declining in popularity and community support, especially those that have more business-friendly licensing arrangements? These are potential candidates for adoption if they are growing in popularity and community support or candidates for elimination or replacement if the community interest is declining.

- **Conferences.** Conferences can be a great way to get a quick glimpse of what the new and emerging “hot” technologies are. The presentations at these conferences can give you a jump start into background information about new technologies and some of the early experiments and results. This will help you become aware of which areas are working well and which areas are still rough around the edges and need more time and testing.
- **Regulatory compliance.** Being aware of the types of changes that regulatory bodies are considering can help prepare you to plan the aspects of the architecture that may need to remain flexible to account for new regulatory requirements.

- **Hardware capabilities.** Hardware is constantly changing. Taking the time to keep up with key vendors and their roadmaps can help you prepare for hardware that may enable better performance or less expensive solutions in the near future.

- **Cloud capabilities.** The area of cloud computing is evolving quickly. Understanding the capabilities provided by cloud vendors can enable elastic growth with little or no effort. The key challenges are to understand the costs and data lock-in that may be associated with the varying solutions.

- **Customers’ competitive knowledge.** One of the best ways to keep up with your competitors is to closely partner with your customers. They can be an excellent source of information about what your competitors are up to and what they are promoting as strategic advantages and differentiators.

- **Vendor capabilities.** A large number of vendors make capabilities available for a price. Some vendors are leaders in their areas of expertise. They often have a solid understanding of what others are doing and what is working well and what is not. Working with these types of vendors can be a great partnership. The key is to ensure that the value being added by the vendor is greater than the cost of using their products.

- **Intellectual property.** Working with your intellectual property counsel or in-house general counsel can help you keep up to speed on areas where the business may want to go after the development of patents or other intellectual property.

- **Email alerts.** Many online sources allow you to set alerts based on keywords. When you hear of a new technology or development, you can put an alert on it using the keywords associated with the technology. Then when there are new updates or recent news, you’ll be one of the first to know, which will help you consistently monitor the space.

**Applying Trend Awareness**

Trending information can be used as a source of guidance when you are trying to determine if a particular area is worth diving into in more detail. It can serve as an early warning that there is a technology-related change in direction that could impact the business, it can serve as an alert that there is
a new opportunity for your business, or it may just serve as a confirmation that there is no cause for concern in this area, at least for now.

Remember that the rate of change may be exponential, and you should expect that things will change quickly in a given technology focus area. Your ability to check in on a regular and frequent basis will help you stay on top of the trends that signal technological changes that could impact your industry and disrupt your business.

**BUSINESS ALIGNMENT**

*Business alignment* is a critical success factor to technology innovation.

**Paying Attention to Trends on Customer Inquiries**

If you are receiving a fair number of inquiries from customers about a particular new trend, it may well be worth your time to consider investing in this area. It is quite possible that they are using this new capability as a differentiator and a means of comparing and contrasting different solutions.

Although the capability may be not be a primary use case for what they want to use the product for and it may not even be used that often, it is something they can put on a checklist and use to make a decision.

Such items can help them gain support and excitement within their organization about why using the product they are considering is a good choice. It can help them justify the cost for the change or the purchase to begin with.

**Getting Customer Feedback**

Your customers are one of your best sources of information. There are different kinds of customers:

- **Fans.** They always have great things to say. Listen for patterns. The key is to find out what is behind the patterns. What is driving their adoption, and what maintains their enthusiasm for your products?
- **Utilitarians.** They are using your product because it is convenient, it is easy, it is practical, and it makes financial sense. The key here is to understand the key value proposition that keeps them coming back.
- **Captives.** They are using your product because they have to. Either they are not the decision makers about buying your product or there are no competing products in the marketplace. The key here is to
understand who drives the purchasing decisions and what influences them.

- **Followers.** They are using your product because others said it was a great product. The recommendation can come from many different sources; it could be from a friend, or it could come from online comments. The key here is to find out what people are recommending and why. This is your real value; it’s an endorsement. In a similar fashion, hearing the negative things others are saying about your product can give you insights into what you need to improve.

No matter who your customers are, you want to make it easy for them to provide feedback. If you use a survey, keep it short, provide some multiple-choice questions, and provide a place for them to type in their comments in their own words. They may praise your product or roast your product, but getting a wide variety of feedback from your customers can give you insights into where you need to go and what improvements you should pursue. It may be as simple as adding link on the product’s website to solicit ways to improve the product.

**Analyzing Customer Feedback**

Once you get the customer feedback, ensure that internally everyone has access to the information, whether it is good or bad. The more access everyone has to this information, the more it can help influence their daily decisions about the work they do (see Figure 10.3).

Look for common patterns in what is being said. You are looking to tell a story that can be used to help understand how your product is doing in the marketplace and help drive where investments should be made.

**When to Be Cautious about Trends**

There are a variety of situations when following or looking to follow new trends is simply not a good idea. For example:

- There is a great new technology and you want to reimplement a system that already works and that customers love.
- You are coming to the close of a major release and the team is working to stabilize the system.
- Your current system is already experiencing significant operational challenges, and the root cause is not known.
- Switching costs outweigh any perceived or realized gains.
One of your major goals as a technology architect is to manage risk, not introduce it. You need to ensure that you have adequate time to recover from destabilizing the system after the new technologies, approaches, or patterns have been introduced. As the idiom goes, “Discretion is the better part of valor.”

The last thing you want to do is harm your reputation unnecessarily or be viewed as reckless by the executives who are overseeing the work that you do. To mitigate this risk, always go in with your eyes wide open and be willing to listen to other people’s perspectives, whether positive or negative. Seek to understand their concerns and make sure you’re considering feedback from all levels.

Any change is difficult, and you don’t want to make it harder by pushing something your company and its people or customers aren’t ready for.
Patience and persistence are valuable skills at this time. If you are right, as mass awareness grows eventually people will come around to seeing the value of your approach and recommendations. Remember that being too early can be just as bad as being too late. Timing is everything.

**When to Embrace a Trend**

There are a variety of situations that naturally lend themselves to exploring trends and bringing new and innovative approaches to the problems that need to be solved. These include the following:

- The business wants to do a technology refresh and modernize the technology stack for an important application or system.
- The business wants to establish a presence in a new market with a new set of applications or systems.
- The current set of technologies, approaches, and processes has been determined to be inadequate for solving the problems at hand, and a new approach is not only warranted but welcomed by everyone involved.

If you seek to introduce new ideas at the appropriate times, you will gain the trust of the business that you can take a pragmatic approach to moving the business forward. This form of partnership will serve you well.

**STRATEGIC RESEARCH**

“Research is formalized curiosity. It is poking and prying with a purpose.”

—Zora Neale Hurston

At any given time there are only a limited number of research projects or areas that can be undertaken. Several factors should be considered when determining what areas are the ones that should be explored. These include

- **Alignment with strategic business goals.** Research should be focused on an area that both the business and technology need to learn about in order to be able to move forward with a particular set of projects or areas that the business wants to pursue or invest in.
- **Agreed-upon prioritization.** Both technology and the business should agree that this area of research is needed, that the limited funding available for this type of research would be well spent, and that this is a high priority for both areas.
Agreed-upon purpose. Both technology and the business should be in agreement about the purpose and desired outcomes of the research. Is it to determine the feasibility of pursuing a particular area? Is it to reduce the risk? Is it to help appropriately size the investment request? Is it to better understand the threat that this technology poses to the business? Is it to better understand the opportunities a particular area may offer? Are there legal and regulatory issues that need to be fleshed out?

Agreed-upon time and resource allocation. Both technology and the business should agree upon a time box that this research will fit into. Ideally, this is measured in days. The goal should be to do the research in a cost-effective manner, and to the greatest degree possible limit the amount of time, money, and resources being used to pursue it. Are there other areas in the business with which you can share the cost of this research if it turns out to be a larger endeavor?

Agreed-upon report-out mechanism. As the research is pursued, how will the progress and lessons learned be reported out to the business? Are there natural points at which these report-outs can help determine if this area of research is worth continuing to pursue? Are there other areas of the business that would be interested in the outcomes of the research? Can you post these findings in an internally accessible collaboration area to let others know how the research is progressing? If necessary, can you control who has access to the research findings, depending on the nature of the research?

The key is to partner with the business to determine the parameters that surround strategic research.

Research Approaches

Several different approaches to pursuing research can be taken, such as the following:

- **Business unit driven.** This research is done internally within a business unit. The resources working on it typically are not devoted 100% to research.
- **R & D.** This research is done by a dedicated research and development team. It is often staffed with resources who have Ph.D.s in specific areas of interest to the business. They also are typically actively involved in the broader academic research community.
- **University partnership.** This research is done in partnership with a university. It allows the university to get exposure to challenging
business problems and information that is generally not publicly available, and the business gets access to professors and students who specialize in a particular area of interest.

- **Open innovation challenges.** This is a research challenge that typically is constructed in partnership with a company such as Inno-Centive. Working with you and your team, they will help frame the research problem or question into a challenge. They will also handle any intellectual property treatments and any awards for the winners of the challenge. The challenge itself can be open to the public or open only to those within your business. A successful challenge typically results in a crowdsourced solution to a specific business problem.

- **Corporate innovation labs.** These are effectively start-up groups that are formed within the overall business. They focus on rapid experimentation and validated learning through interacting with real customers. They often employ A/B testing to help drive decisions about which alternative solution is working better.

The goal is to pick the approach or mix of approaches that makes the most sense for your business situation. The key is to find ways to inject new ideas and approaches into the business that will enable it to grow.

**TECHNOLOGY INNOVATION PRINCIPLES**

Technology innovation has the ability to bring disruptive technologies to the business. The challenge is to bring these technologies forward at the right time and in partnership with the business to enable the best possible chances for success.

**Seek Approved but Minimal Time and Funding to Explore**

Ideally, you should be able to get a limited amount of business-approved work time to explore new technologies and trends. This may take the form of

- Small research projects
- Exploratory prototypes
- Reading research papers
- Attending conferences that are focused on the area of business interest
- Reading blogs, magazines, or books that may enable new capabilities
Citing successful and innovative companies such as Google, 3M, and HP that allow employees “innovation time” to focus on and research new areas may also help in your efforts to obtain approval.

Ideally, your research request would be done in conjunction with your business partners in an area that

- They are looking to move into
- Is currently extremely hard for them to solve
- Requires a significant amount of manual effort to deal with

**Make Small Bets**

The goal is to survive to live another day. You don’t want the entire business riding on a single investment if you are unsure of its long-term future. Being prudent with these kinds of decisions allows you to fail quickly, with the least amount of disruption to the business, and learn how to improve.

**Use Technology Scouting to Scan and Track the Trends Regularly**

The goal with scouting technology trends is to learn about new things on a regular basis (see Figure 10.4) and find out

- What is applicable to the business
- What things need to wait on the back burner while they mature
- What things warrant further investigation

Keep an eye on new and emerging trends using the scouting method of scanning the landscape to identify what’s new and interesting, then track those trends that look promising and apply them to your business. Scanning and tracking technology trends is of less value if the information obtained is not shared, so try to find a venue to share your findings and continue to make updates so your research is up-to-date and relevant.

**Note**

Maximize the quality of your trend analysis and limit the amount of time you spend by staying hyper-focused and hyper-aware using a technique called “scanning and tracking.”
Unless you are in some special circumstance, trends and trend investigation should not consume a large portion of your time. Major trends change less frequently—you may see the direction change every 6 to 12 months—while minor trends change more rapidly.

By quickly scanning an area of research interest and tracking any major changes, you’ll build up a knowledge base that will make your efforts more efficient the next time you scout the area. Catching these changes, whether the trends are gaining momentum or fading, gives you an indication of whether or not it is worth spending additional time and resources to learn more about a particular area and report out your findings.

**Have a Lab Area**

Having a lab environment can allow you play around with new technologies without a lot of visibility from other areas. For the areas in which you find success, you can bring them forward and have them progress toward a production environment.
Setting up a small lab typically doesn’t cost too much and allows you to do things that would scare the data center folks to no end.

**Use Rapid Experimentation with User Feedback Loops**

Experiments allow you to get firsthand knowledge of what is working or not working and a sense of what the real problems are. When experiments are combined with user feedback, you gain the ability to navigate toward customer needs. In many respects, this is similar to driving a car. You use the information that surrounds you to navigate toward your desired goal.

**Show the Business and Customers Prototypes**

As you have success with new technologies, show the business what is possible. A working example is worth an amazing amount to the business:

- It demonstrates initiative on your part.
- It reduces risk on the part of the business if it chooses to pursue the opportunity.
- It engages your mind in thinking of new ways and approaches to solving problems.
- Small innovations can grow into large enterprises and help sustain the business for the long haul.
- It engages the development team and shows them that working in your company will give them the opportunity to work on cool things and stay current with the industry.

**Introduce New Technologies at the Edge**

As you look to introduce new technologies into existing systems or even new systems, try to find areas near the edge of the systems that will have minimal impacts on the core (see Figure 10.5). This enables you to operationalize the new technology in a quiet manner.

If it fails, the impact will be relatively small and the executives will be less likely to take notice.

On the other hand, if you take out the core revenue-generating software for any period of time, you are likely to get a direct call from senior executives and have some very unpleasant meetings in which your judgment is questioned.
If this does occur:

- Be the first to approach the executives.
- Let them know what the situation is.
- Let them know what the possible resolutions are.
- Let them know what path you recommend.

You are much better off being proactive in this situation than reactive. It gives you an opportunity to be in control and to some degree manage the message that is delivered.
**Pragmatic Technology Innovation**

The key to pragmatic technology innovation is not so much what is here today; the key is to see what is emerging and anticipating the future needs of your business partners and their customers. Watching Gartner’s Hype Cycles, attending leading conferences, and following blogs can help give you a sense of where the industry investments are being made.

Take the time to play around with these technologies; if possible, find a low-profile project to test them on. The important point is to understand what problems are being solved or what business needs will be met.

How does this apply to your business? Think about these questions:

- Where is your business going?
- Where are your chief competitors going?
- Where are your competitors investing?
- Is the business landscape changing?
- Are there new emerging competitors?
- What is happening to your customers’ business model?
- Do you know why your customers’ business model is changing?
- What affects your market adoption?
- Do you need to be more aligned with trendy marketing and product appearance?

Taking the answers to these questions into account can help you navigate the tricky waters of what trends to be aware of, what trends to act upon, and what trends you should ignore.

Today, large sweeping trends are influencing technology. These include the following:

- **Big data.** The big data movement is transforming people’s thoughts about data analytics, data visualization, and content processing. Hadoop and MapReduce are becoming widely used technologies across all industries. An ever-growing set of technologies is integrating with the Hadoop Distributed File System (HDFS) and making access to big data ubiquitous. Your ability to understand customers and craft user-centric experiences has never been more important. Incorporating information life-cycle semantics into your
architecture can enable significantly improved user experiences as
your understanding of the users increases.

- **Mobile.** Expectations of mobile as a primary application access point are becoming commonplace. Understanding the user experience within your application as being lean forward (highly interactive) versus lean back (consuming content) is critical to ensuring that the user has a great experience. This understanding along with anticipating users’ tendencies to multitask can drive your architectural approaches for the best ways to deliver content.

- **Networked platforms.** With the rise of cloud computing and the proliferation of devices and sensors, platforms are slowly becoming more and more interconnected. Understanding the need to interact with users as well as systems can help drive the architectural layering and the secure API development that are needed to enable networked platforms.

The trends are constantly changing. The key is to be aware of them and to understand their ability to impact your areas of technology innovation. The trends tend to move relatively slowly, but your awareness of them and your ability to apply them appropriately to your business at the right time are critical to keeping your architecture current and relevant to the business.

**SUMMARY**

The road to technology innovation begins with

- Being aware of the trends
- Aligning with the business
- Engaging in strategic research
- Using innovation principles
- Being a pragmatic technology innovator

Watching and following trends can be fun and exciting. They can easily distract you from the job at hand. However, they are also the eyes into the future that may provide opportunity or peril. Architects need to be familiar with the trends that are swirling around them and approach them with caution.

Technology innovation is a critical aspect of software architecture. Learning when and where to introduce new and potentially disruptive technologies into the business is essential for business growth and operational stability.
REFERENCES


A
Acquisition projects, estimating, 86
Advisory boards, for platform development, 150–151
Affordable Loss Principle, 276
Agile development, and governance, 209–210
Alignment
architecture review board, 10–11
choosing partners, 7–9
community review, 10–11
decision making, 11
influencers, 10
shared vision, 11–12
stakeholders, 8–9
thought leaders, 9
trusted advisers, 10
Alternative financing, 86–87
Ambiguity, dealing with, 217
API explorers, 154
APIs, designing, 147–148
Applications
consolidating during platform development, 163
vs. platforms, estimation, 93
Approach reviews, 206
Architectural approach to estimation. See Estimation, architectural approach
Architectural communication. See also Presentation
context diagrams, 185
domain models, 184
executive overview diagrams, 187
hardware environment diagrams, 187–188
in the ideation and discovery phases, 184
logical architecture diagrams, 186–187
process diagrams, 184–185
RAID (risks, assumptions, issues, dependencies), 188–191
system boundaries, showing, 185
system components, showing, 186–187
user interface mock-ups, 186
work flow, showing, 184–185
Architectural concerns
availability, 178–179
business continuity, 196–197
changing the system, 182
compatibility, 182
disaster recovery, 196–198
extensibility, 181–182
maintenance windows, 179
open-source licensing, 195–196
power outages, 179
repeatability, 182
scalability, 180–181
security, 201–202
server failure, 179
site loss, 179
site outages, 179
software compatibility issues, 179
storage failure, 179
storage full, 178–179
sustainability, 182–183
third-party integration, 182–183
Architectural elevator speech, 126
Architectural overviews, platform development, 154
Architectural perspectives. See also specific perspectives
definition, 170
overview, 171
Architectural principles
cost of delay, 176–177
KISS (Keep It Simple, Stupid), 175–176
Law of Demeter, 172
meeting user expectations, 170–172
minimizing dependencies, 172
narrowly defining services, 175
Occam’s Razor, 175–176
Principle of Feedback, 177
Principle of Last Responsible Moment, 176–177
Principle of Least Effort, 172–173
Principle of Least Knowledge, 172
Principle of Least Surprise, 170–172
Principle of Natural Intuition, 171
Architectural principles (continued)

Principle of Opportunity Cost, 173–175
Principle of Parsimony, 175–176
Principle of Single Responsibility, 175
solving immediate problems, 172–173
Zipf’s Law, 172–173

Architecture review board, 10–11
Architecture reviews
approach, 206
development, 207
enterprise, 207
executive, 206–207
governance areas, 206–207
hardware, 207
peer, 207

Assumptions
establishing, 68–69
RAID (risks, assumptions, issues, dependencies), 68–69

Automation, governance principles, 203

Availability, architectural concerns, 178–179

B

Bargaining, in estimation, 101
BCPs (business continuity plans), 197–198
Big data trends, 252–253
Bird-in-the-Hand Principle, 277
Blogging, 225
Building, governance area, 208–209
Business case estimate, 82
Business case validation estimates, 82
Business continuity, architectural concerns, 196–197
Business continuity planning, governance principles, 196–198
Business discovery, 52
Business goals
aligning research with, 245
discovery of your business, 52
platform development ecosystems, 153
strategic roadmapping principles, 262
Business unit driven research, 246

C

Calculated risk taking, 275–276
Capabilities
APIs, designing, 147–148
conceptual models, 147
defining, 146
defining objectives, 145–146
definition, 144
establishing, 69–70
leveraging, 146–147
Captive customers, 242–243
Caving in
decision making, 124
in estimation, 101
resolving issues, 124
Changing the system, architectural concerns, 182
Checklists for estimation, 99
Cloud capability trends, 241
Code names, strategic roadmapping, 258
Coding, governance areas, 208–209
Collaboration
becoming a mentor, 22–23
bringing value to the table, 22
giving feedback, 23
moving toward ideation, 24
seeking a mentor, 23–24
as a source of opportunity, 24
strategic roadmapping, 258
strengthening partnerships, 24–25
Commitment
concept formation, 62–63
overcommitment, 13–15
time management, 127–128
Communication. See Architectural communica-
tion; Documentation; Presentations; Visual models
Community review, 10–11
Company assets, consolidating during platform
development, 157–158
Compatibility, architectural concerns, 182
Competition, studying, 48–50
Complexity, reducing, 72–73
Concept evolution
adjacent opportunities, 75
conceptual integrity, 73–75
history of the concept, 71–72
multiple perspectives, 72–73
reducing complexity, 72–73
Concept formation
conceptual diagrams, 64
context diagrams, 64
customer involvement, 65–66
domain models, 59, 61
eyear involvement, 65
identifying main concepts, 60
listening to the customer, 65–66
making a commitment, 62–63
problem scope, 60–62
saying no, 62–65
speaking the customer’s language, 59–60
visual models, 63–67
Concept life cycle, 58
Concept reification
assumptions, establishing, 68–69
customer involvement, 70–71
customer pain points, 70
customer roles, establishing, 69–70
definition, 67
essential capabilities, establishing, 69–70
experimentation, 68
MVPs (minimum viable products), 67
POCs (proofs of concept), 68–69
reevaluating the product concept, 69–70
Conceptual diagrams, 64
Conceptual integrity, 73–75
Conceptual models for platform capabilities, 147
Conceptualization. See also Ideation
concept life cycle, 58. See also specific stages
early involvement, 57
overview, 55
Concerns. See Architectural concerns
Conferences
attending, 220
presenting at, 223
for professional development, 132–133
trends, 240
Configurability vs. hard coding, 165
Consolidating
applications during platform development, 163
company assets during platform development, 157–158
Context
business, 17
contributing to your partner’s success, 20–21
for decision making, 52
guarding relationships, 20
safety in numbers, 21
technical decisions, 18–19
when presenting information, 19–20
Context diagrams, 64, 185
Contractual relationships vs. partnerships, in estimation, 88–89
Corporate innovation labs, 247
Cost estimation. See Estimation
Costs
of delay, architectural principle, 176–177
of disruption, governance principles, 196–198
platform development, 161–162
saving money, 228
Credibility, 275
Customer feedback
analyzing, 243
getting, 242–243
Customer inquiries, trend analysis, 242
Customer involvement
concept formation, 65–66
concept reification, 70–71
Customer pain points, 70
Customer roles, establishing, 69–70
Customers. See also Discovery, of customers; Users of platforms
captives, 242–243
fans, 242
followers, 243
interaction with during platform development, 153
perspective of, 35–37
as platform users, 148, 153
themes, identifying, 50–51
training courses. studying, 37
utilitarians, 242
value, identifying, 47–48
Customers’ competitive knowledge trends, 241
Customer’s language
concept formation, 59–60
learning, 42
NPD (new product development), 34

D
Dashboards, 226–227
Data centers, 114–115
Data lock-in, governance principles, 203
Data portability, governance principles, 203
Deadlines, time management, 130
Decision making
alignment, 11
business context for, 52
consistency, 122–124
knowing when to cave, 124
Decision making (continued)
with limited data and time, 130
role of alignment, 11
standing your ground, 125
technical decisions as political decisions, 18–19
Delegation, 130–131
Delivering projects
areas of responsibility for architects, 119–120
concentrating on problem areas, 118
contractors in leadership positions, 119
eliminating dependencies, 116
managing by walking around, 120–121
managing expectations, 116–117
mastering the development process, 117
nontransparency, 118–119
partnering with project managers, 116
Delivering results, 276
Demos, platform development, 154
Dependencies
eliminating, 116
minimizing, 172
RAID (risks, assumptions, issues, dependencies), 116
Dependency awareness, strategic roadmapping, 257
Deployment
governance areas, 208–209
platform development, 159–160
Design reviews, 208
Development process, mastering, 117
Development reviews, 207
Development staff. See Teams
Diagrams
conceptual, 64
context, 64, 185
executive overview, 187
hardware environment, 187–188
logical architecture, 186–187
process, 184–185
simplifying, 126
Disagreement, voicing, 125
Disaster recovery
architectural concerns, 196–198
governance principles, 196–198
Discovery. See also Strategic research
definition, 30
keys to, 30, 31. See also specific keys
Discovery, of customers
accessing products, 36
customer’s perspective, 35–37
interviewing key people, 36
marketing department, 32–37
meeting with customers, guidelines for, 37–43
NDAs (nondisclosure agreements), 38
NPD (new product development), 34–35
partnering with customers, 32–37
sales department, 32–37
studying marketing materials, 35–36
support calls, 36
techniques for, 35–37
training courses, 37
Discovery, of the market
customer themes, 50–51
customer values, 47–48
guidelines, 43–46
studying the competition, 48–50
[the]customer’s customer, 46–47
Discovery, of your business
business context for decision making, 52
goals and strategies, 52
Divestitures, platform development, 158
Documentation, platform development, 159. See also
Presentations
Domain models
architectural communication, 184
concept formation, 59, 61
Drive-by estimation, 80–81

E
Ecosystems, platform development
advisory boards, 150–151
aligning with company goals, 153
conflicting requirements, 153
consolidating applications, 163
consolidating company assets, 157–158
contractors for, 158
costs, 161–162
definition, 144
deployment, 159–160
divestitures, 158
documentation, 159
funding, 149–150
grooming the right team, 158–161
intellectual property management, 160–161
interaction with end customers, 153
leveraging common assets, 163
leveraging other platforms, 163
mergers and acquisitions, 157
mobile support, 163–164
on-boarding new partners, 153–154
oversight, 150–151
platform awareness and acceptance, 154–155
platform integration, 162–164
platform management, 155–158
platform ownership, 148–155
platform users, 148, 153
political issues, 150–151
pre-engagement materials, 152
quality management, 162. See also Technology excellence
requirements management, 152–153, 159
steering committees, 150–151
timely feedback, 153
type of integration, 163
user interface, 163
Education. See Enhancing your skill set; Know-how
E-mail, time management, 131
E-mail alerts, trends, 241
Enhancing your skill set. See also Know-how
becoming an expert, 135
doing technical things every day, 134–135
local conferences and user groups, 132–133
mastering the development process, 117
mentorship programs, 131–132
sitting with other architects, 134
stretching your comfort zone, 135
technology forums, 132
Enterprise reviews, 207
Entrepreneurial execution
architecting with, 282–283
calculated risk taking, 275–276
credibility, 275
definition, 272
delivering results, 276
depth of knowledge, 274
elements of, 273–276
focus, 274
innovation, 274
optimism, 274
passion, 274
thriving on adversity, 274
trusting your gut, 274
Entrepreneurial execution, principles
Affordable Loss Principle, 276
Bird-in-the-Hand Principle, 277
following your passion, 278–279
learning by doing, 280
Lemonade Principle, 276–277
Patchwork Quilt Principle, 277
Pilot-in-the-Plane Principle, 277
pivoting, 279–280
seeking feedback, 281–282
seeking leverage, 282–283
seizing the moment, 278
shiny object syndrome, 277
Entrepreneurship, definition, 272
Estimation
business case estimate, 82
business case validation, 82
drive-by, 80–81
governance areas, 204–205
level of detail, 80–82
overview, 80–84
project context, 82
purpose of, 80–82
quick sizing effort, 80–81
rough order of magnitude, 81
Estimation, architectural approach
business rationale, 89
external research, 96
issues to consider, 92
leverageable components, 96–97
marketing approach, 89–90
organizational structure, 95–96
overview, 82–84
partnerships vs. contractual relationships, 88–89
platforms vs. applications, 93
repeat estimates, 90–91
re-platforming, 93–94
risk management, 91–93
technologies involved, 94–95
Estimation principles
avoiding negativity, 100
bargaining, 101
beware of external estimates, 101
caving in, 101
flexibility in design decisions, 100
knowing the hard problem, 100
knowing the targeted price, 101–102
opportunities to say yes, 100–101
providing options, 100
scheduling, 100, 102
trusting your gut, 101
Estimation process
for acquisition projects, 86
alternative financing, 86–87
engaging executives, 103–104
financing, business process, 87–88
for integration projects, 86
leverage points, 103
for maintenance projects, 85
for migration projects, 85
for new/enhancement projects, 85–86
personnel involved, 102
pipeline process, 84–85
project centric financing, 87
reviewing estimates with executives, 126
selling the estimate, 104–106
spending envelope financing, 86–87
timeline, 102
types of projects, 85–86
validating the estimate, 105–106
visual presentation, 103
Estimation strategies
concentrating on the critical, 98
developing checklists, 99
estimation feedback loops, 98
executive and organizational buy-in, 99
organization coupling and cohesion, 98
planning for unknowns and challenges, 97
PowerPoint presentations, 99
realistic expectations, 98
Executive overview diagrams, 187
Executive reviews, 206–207
Executives. See also Management
engaging in the estimation process, 103–104
estimation buy-in, 99
Experimentation, 68
Extensibility, architectural concerns, 181–182
External partnerships, 26

Feedback loops
for estimation, 98
technology innovation principles, 250
Financing
alternatives, 86–87
business process, 87–88
governance areas, 206
platform development, 149–150
project centric, 87
spending envelope, 86–87
technology innovation principles, 247–248
Follower customers, 243
Funding. See Financing
Fuzzy front end. See Conceptualization

G
Goals, business
aligning research with, 245
discovery of your business, 52
platform development ecosystems, 153
strategic roadmapping principles, 262
Goals, quality, 164
Governance
and agile development, 209–210
definition, 194
Governance principles
automation, 203
business continuity planning, 196–198
cost of disruption, 196–198
data lock-in, 203
data portability, 203
disaster recovery, 196–198
IAM (identity and access management), 202–203
integration, 203
leveraging common capabilities, 199–200
loose coupling between business units, 198–199
open-source usage, 195–196
Principle of Least Authority, 202
Principle of Least Privilege, 202
regulatory compliance, 200–201
security, 201–202
vendor lock-in, 194–195
Grooming technical talent. See also Mentoring

hiring the best people, 133–134
local conferences and user groups, 132–133
mentorship programs, 131–132
technology forums, 132
Guiding principles, platform development
configurability vs. hard coding, 165
definition, 144
leverageability, 165
linear scalability, 166
operational excellence, 165
platform entanglement, 166
platform sprawl, 166
quality goals, 164
redundant architecture, 166
technical debt, 165
upgrading to current technologies, 166

H
Hack-a-thons, attending/hosting, 221
Hard coding vs. configurability, 165
Hardware capability trends, 241
Hardware environment diagrams, 187–188
Hardware reviews, 207
Hiring the best people, 133–134

I
IAM (identity and access management), 202–203
Ideation phase. See also Conceptualization
architectural communication, 184
definition, 56
in partnerships, 57
-ilities. See Architectural concerns
Industry trends, 239–240
Influencers, 10
Innovation, entrepreneurial execution, 274
Instrumentation, 226–227
Integration
governance areas, 208–209
governance principles, 203
platform development, 162–164
types of, 163
Integration projects, estimation, 86
Intellectual property
management, 160–161
trends, 241
Introducing new technologies, 250–251
IT compliance, 206

K
KISS (Keep It Simple, Stupid), 175–176
Know-how. See also Enhancing your skill set
applying to your domain, 215–217
blogging, 225
central conferences, attending, 220
central conferences, presenting at, 223
currency, 214, 218–221
dealing with ambiguity, 217
definition, 214
developing a model, 217
design excellence, 214, 221–229
design excellence, 214, 221–229
designing a model, 217
excellence, 214, 221–229
evaluating designs, 220, 222
evaluating technologies, 215–217
features, 217–218
software construction process, 229
technology knowledge
acquiring, 218–221
technology knowledge
acquiring, 218–221
teach a class, 224
teach a class, 224
user groups, as resources, 222–223
vetting, 217–218
writing a book, 224–225
Know-how, technology knowledge
acquiring, 218–221
evaluating technologies, 215–217
Know-how-driven architecture, 230–231
L
Lab areas, 249–250
Law of Demeter, 172
Learning by doing, 280
Legal compliance, 206
Lemonade Principle, 276–277
Leverage, seeking, 282–283
Leverageability, platform development, 165
Leverageable components, in estimation, 96–97
Leveraging
   capabilities, 146–147
   common assets, 163
   common capabilities, 199–200
   online resources, 221
   other platforms, 163
   solutions, 115
Live demos
   acquiring know-how, 223
   platform development, 154
Logical architecture diagrams, 186–187
Loose coupling between business units, 198–199

M
Maintenance projects, estimating, 85
Maintenance windows, architectural concerns, 179
Making small bets, 248
Management. See also Executives
   definition, 110
   key areas of responsibility, 110. See also specific areas
Management concerns, governance areas, 205–206
Managing by walking around, 120–121
Managing expectations, 116–117
Managing your time. See also Time allocation
   avoiding e-mail, 131
   defining your role, 128
   delegating, 130–131
   limit meeting attendance, 130
   limiting commitments, 128
   making decisions under constraints, 130
   meeting in person, 131
   prioritizing, 128–130
   setting deadlines, 130
Market, discovery of
   customer themes, 50–51
   customer values, 47–48
   guidelines, 43–46
   studying the competition, 48–50
   [the]customer’s customer, 46–47
Marketing approach to estimation, 89–90
Marketing materials, discovery of customers, 35–36
Measuring strategic roadmapping, 259
Meetings
   with customers, guidelines for, 37–43
   limiting your attendance, 130
   time management, 130
Mentoring, 22–23. See also Grooming technical talent
Mentorship programs, 131–132
Mergers and acquisitions, platform development, 157
Migration projects, estimating, 85
Mobile support, platform development, 163–164
Mobile trends, 253
Modeling concepts. See Visual models
Models, developing, 217
Monitoring, governance areas, 208–209
MVPs (minimum viable products), 67

N
NDAs (nondisclosure agreements), 38
Negativity in estimation, 100
Networked platforms, trends, 253
New/enhancement projects, estimating, 85–86
NPD (new product development), 33–35

O
Objectives, defining, 145–146
Occam’s Razor, 175–176
On-boarding new partners, 153–154
Online communities, source of know-how, 225–226
Online resources, leveraging, 221
Open disclosure, 12–13
Open innovation challenges, 247
Open-source licensing, architectural concerns, 195–196
Open-source projects, source of know-how, 225–226
Open-source tools, trends, 240
Open-source usage, governance principles, 195–196
Operational excellence, 165
Operations support, 114–115
Optimism, 274
Organizational structure, and estimation, 95–96
Organizations
  coupling and cohesion, 98
  estimation buy-in, 99
Overcommitment
  avoiding, 13–14
  coping with, 14–15
Oversight, platform development, 150–151
Ownership, platforms, 148–155

P
Partnering with executives
  avoid interrupting, 127
  confidence, 127
  having your boss’s back, 127
  managing risk through transparency, 125–126
  reviewing estimates, 126
  simplifying presentation diagrams, 126
Partnerships. See also Relationships
  choosing partners, 7–9
  conceptualization, 57
  context, 17
  vs. contractual relationships in estimation, 88–89
  contributing to your partner’s success, 20–21
  with customers, 32–37
  definition, 6
  external, 26
  having your partner’s back, 20
  ideation, 57
  key aspects, 6. See also specific aspects
  moving toward ideation, 24
  on-boarding new partners, 153–154
  political decisions, 19
  with project managers, 116
  safety in numbers, 21
  as a source of opportunity, 24
  strengthening, 24–25
  technical decisions, 18–19
  with universities, 246–247
Passion, 274, 278–279
Patchwork Quilt Principle, 277
Patent searches, 114
Peer reviews, 207
Performance tuning, 227–228
Perspective. See Architectural perspective
Pilot-in-the-Plane Principle, 277
Pipeline estimation process, 84–85
Pivoting, 279–280
Platform, definition, 143
Platform development
  consolidating company assets, 157–158
  contractors for, 158
  definition, 144
  key elements, 144–145. See also specific elements
Platform entanglement, 166
Platform sprawl, 166
Platforms
  vs. applications, estimation, 93
  awareness and acceptance, 154–155
  integration, 162–164
  managing, 155–158
  ownership, 148–155
  users, 148, 153
POCs (proofs of concept)
  calculated risk taking, 275
  concept reification, 68–69
  developing know-how currency, 220
  developing know-how excellence, 222
Political issues
  platform development, 150–151
  technical decisions, 18–19
Portfolio management, governance areas, 205
Power outages, architectural concerns, 179
PowerPoint presentations, for estimates, 99
Pre-engagement materials, platform development, 152
Prerecorded product overviews, platform development, 152
Presentations. See also Architectural communication; Documentation; Strategic roadmapping; Visual models
  architectural overviews, 154
  estimates, 99, 103
  FAQs, 152
  on-boarding new partners, 153–154
  PowerPoint, 99
  pre-engagement materials, 152
  prerecorded product overviews, 152
  scripted live demos, 154
  simplifying diagrams, 126
  white papers, 152
Principle of Feedback, 177
Last Responsible Moment, 176–177
Principle of (continued)
Least Authority, 202
Least Effort, 172–173
Least Knowledge, 172
Least Privilege, 202
Least Surprise, 170–172
Natural Intuition, 171
Opportunity Cost, 173–175
Parsimony, 175–176
Single Responsibility, 175

Principles of
architecture. See Architectural principles
cost estimation. See Estimation principles
time management, 128–130

Problem resolution. See Resolving issues
Process diagrams, 184–185
Procurement, governance areas, 205
Product lines, governance areas, 205–206
Professional development. See Enhancing your skill
set; Know-how
Project centric financing, 87
Project life cycle diagram, 3. See also specific
stages
Project management know-how, 228–229
Project skills, 1–3. See also specific skills
Projects, delivering
areas of responsibility for architects, 119–120
concentrating on problem areas, 118
contractors in leadership positions, 119
eliminating dependencies, 116
managing by walking around, 120–121
managing expectations, 116–117
mastering the development process, 117
nontransparency, 118–119
partnering with project managers, 116

Proofs of concept (POCs). See POCs (proofs of
cost concept)
Publishing strategic roadmaps, 259

Q
Quality goals, platform development, 164
Quality management, platform development, 162.
See also Technology excellence

R
RAID (risks, assumptions, issues, dependencies),
188–191
Rapid experimentation, 250
R&D approach to research, 246
Redundant architecture, 166
Reevaluating the product concept, 69–70
Refactoring code, 35
Regulatory compliance
governance areas, 206
governance principles, 200–201
trends, 241
Reification. See Concept reification
Relationships. See also Partnerships
dealing with caustic people, 26–27
external partnerships, 26
give-and-take, 25–26
overcoming bad experiences, 26
purpose of, 25
Repeatability, architectural concerns, 182
Re-platforming, estimation, 93–94
Report-out mechanism, strategic research, 246
Requirements management
conflicting requirements, 153
platform development, 152–153, 159
Research. See Discovery; Strategic research
Resolving issues
asking the tough questions, 121
being consistent in your decisions, 122–124
head-on, 124
knowing what is not your problem, 125
knowing when to cave, 124
in the moment, 121–122
RAID (risks, assumptions, issues, dependencies),
188–191
saying no, with options, 122
standing your ground, 125
voicing disagreement, 125
Reviews
  design validation, 208
  estimates, 126
Reviews, architecture
  approach, 206
devlopment, 207
enterprise, 207
executive, 206–207
hardware, 207
peer, 207
review board, 10–11
Risk management
  A/B testing, 275
calculated risk taking, 275–276
estimation, 91–93
minimizing investments, 275
RAID (risks, assumptions, issues, dependencies), 188–191
Risks, assumptions, issues, dependencies (RAID), 188–191
Roadmapping. See Strategic roadmapping
Rough order of magnitude estimation, 81

S
Saying no
  concept formation, 62–63
  importance of, 15–16
  resolving issues, 122
Saying yes, in estimation, 100–101
Scalability
  architectural concerns, 180–181
  linear, 166
Scaling, know-how, 227–228
SCQA (situation, complication, question, answer).
  See SCRAP (situation, complication, resolution, action, politeness)
SCRAP (situation, complication, resolution, action, politeness), 19–20
Scripted live demos, 154
Security. See also Disaster recovery
  architectural concerns, 201–202
  governance principles, 201–202
Seizing the moment, 278
Selling know-how, 217–218
Server failure, architectural concerns, 179
Shared vision, 11–12
Shiny object syndrome, 277
Site loss, architectural concerns, 179
Site outages, architectural concerns, 179
Skill development, 287–288. See also Enhancing your skill set; Grooming technical talent; Know-how; Mentoring
Skills. See Project skills; Technology skills; Visionary skills
Soft skills, 287–288
Software compatibility issues, architectural concerns, 179
Software construction process, 229
Spending envelope financing, 86–87
Stakeholders, identifying, 8–9
Steering committees for platform development, 150–151
Sticky notes, strategic roadmapping, 260
Storage failure, architectural concerns, 179
Storage full, architectural concerns, 178–179
Strategic research. See also Discovery
  alignment with business goals, 245
approaches, 246–247
  business unit driven approach, 246
corporate innovation labs, 247
external, 96
open innovation challenges, 247
prioritization, 245
purpose of, 246
R&D approach, 246
report-out mechanism, 246
time and resource allocation, 246
university partnerships, 246–247
Strategic roadmapping
  architect's role, 265–266
considerations, 266–267
definition, 256
finding what energizes you, 265
key milestones, 264–265, 269
socialization, 268–269
uses for, 266
visual representation, 258
visualizing, 256
Strategic roadmapping, elements of
  code names, 258
collaboration, 258
Strategic roadmapping, elements of (continued)
- context dependency, 258
- dependency awareness, 257
- iteration, 259
- measuring, 259
- multidisciplinary, 258
- personalization, 258
- prioritization, 259
- publishing, 259
- specialization, 258
- strategic focus, 257
- swim lanes, 257
- time sequencing, 257
- updating, 259
- visual representation, 258

Strategic roadmapping, principles
- finding what energizes you, 265
- focus on the destination, 264–265
- getting started, 262
- having fun, 262
- keeping it simple, 261–262
- key milestones, 264–265
- partnering with the business, 262
- setting goals, 262
- skill and knowledge gaps, identifying, 263
- taking a new route, 263–264
- target areas, identifying, 263
- timing flexibility, 263

Strategic roadmapping, strategies
- capturing underlying principles, 261
- roadmapping as a project, 261
- sticky notes, 260
- whiteboarding, 260
- working backward, 260
- workshops, 260–261

Striving toward technology excellence
- data centers and operations support, 114–115
- dealing with technical debt, 112
- establishing a vision, 112
- generalizing solutions, 115
- keeping technical staff engaged, 113
- leveraging solutions, 115
- patent searches, 114
- strategic solutions, 115

Support calls, discovery of customers, 36–37
Sustainability, architectural concerns, 182–183
Swim lanes, strategic roadmaps, 257
System boundaries, showing, 185
System components, showing, 186–187

T
Teaching classes, 224
Teams. See also Grooming technical talent
- hiring the best people, 133–134
- for platform development, 158–161
Technical debt, 112, 165
Technical skills, 287–288
Technologies involved in estimation, 94–95
Technology excellence. See also Quality management
- data centers and operations support, 114–115
- dealing with technical debt, 112
- establishing a vision, 112
- generalizing solutions, 115
- keeping technical staff engaged, 113
- leveraging solutions, 115
- patent searches, 114
- strategic solutions, 115
Technology forums, 132
Technology innovation
- definition, 238
- pragmatic, 252–253
Technology innovation, business alignment
- customer feedback, 242–243
- trend analysis, 243–245
- trends on customer inquiries, 242
Technology innovation, principles
- feedback loops, 250
- introducing new technologies, 250–251
- lab areas, 249–250
- making small bets, 248
- rapid experimentation, 250
- time and funding, 247–248
- trend scouting, 248–249
Technology innovation, strategic research
- alignment with business goals, 245
- approaches, 246–247
- business unit driven approach, 246
- corporate innovation labs, 247
- open innovation challenges, 247
- prioritization, 245
purpose of, 246
R&D approach, 246
report-out mechanism, 246
time and resource allocation, 246
university partnerships, 246–247
Technology innovation, trend awareness
applying, 241–242
big data trend, 252–253
cloud capabilities, 241
conferences, 240
customers’ competitive knowledge, 241
e-mail alerts, 241
hardware capabilities, 241
industry, 240
intellectual property, 241
mobile trend, 253
networked platform trend, 253
open-source tools, 240
regulatory compliance, 241
university research, 240
vendor capabilities, 241
Technology knowledge management, 141. See also Know-how
Technology leverage, 141. See also Platform development
Technology oversight, 141. See also Governance
Technology skills. See also specific skills
dimensions of, 141
overview, 139–140
Testing, governance areas, 208–209
Third-party integration, architectural concerns, 182–183
Thought leaders, 9
Time allocation. See also Managing your time strategic research, 245–246
technology innovation principles, 247–248
Training. See Enhancing your skill set; Know-how
Transparency
delivering projects, 118–119
in partnerships, 16–17
risk management, 125–126
Trend analysis, 243–245
Trend awareness
applying, 241–242
big data, 252–253
cloud capabilities, 241
conferences, 240
customer inquiries, 242
customers’ competitive knowledge, 241
e-mail alerts, 241
hardware capabilities, 241
industry, 240
intellectual property, 241
mobile, 253
networked platforms, 253
open-source tools, 240
regulatory compliance, 241
trend analysis, 243–245
trend scouting, 248–249
university research, 240
vendor capabilities, 241
Trend scouting, 248–249
Trust
establishing, 12
learning to say no, 15–16
open disclosure, 12–13
overcommitting, 13–15
transparency, 16–17
Trusted advisers, 10
Trusting your gut
er entrepreneurial execution, 274
estimation, 101
U
University partnerships, strategic research, 246–247
University research trends, 240
Upgrading to current technologies, 166
User groups
for professional development, 132–133
as resources, 222–223
User interface
mock-ups, 186
platform development, 163
Principle of Least Effort, 172–173
Users of platforms, 148, 153. See also Customers
Utilitarian customers, 242
V
Validating estimates, 82, 105–106
Vendor capability trends, 241
Vendor lock-in, governance principles, 194–195
Vetting know-how, 217–218
Index

Vision, establishing, 112
Visionary skills, 233–235. See also specific skills
Visual models
  concept formation, 63–67
  conceptual diagrams, 64
  context diagrams, 64

W
White papers, platform development, 152
Whiteboarding, strategic roadmapping, 260
Work flow, showing, 184–185
Workshops, strategic roadmapping, 260–261
Writing a book, 224–225

Z
Zipf’s Law, 172–173