

THE FUTURE OF THE APP

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February 3, 2012

Abstract: Customer relationships are moving online. This shift is leading companies to adopt a new kind of business strategy based in contextual interpretation of data. To execute such strategies, companies will adopt a new kind of application architecture. Companies should assess their position relative to these trends, and shape their plans for customer relationship management and information technology architectures accordingly.

Special thanks to Avner Aharoni, Phil Bernstein, Dave Campbell, Mike Ehrenberg, Jean Ferré, Rolf Harms, Darryl Havens, Peter Haynes, Mike Kunz, Burton Smith, Sally Solaro, Mihail Tarta, Anders Vinberg, and Eric Watson for their comments on versions of this paper. All opinions expressed are those of the authors.

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1. Introduction

The landscape of business is shifting. This shift will in turn cause companies to adopt a new business strategy. Executing that strategy will lead to fundamental changes in the way companies organize themselves and their information systems. The technical focus of the change will be on the way in which the company implements the information system they use for delivering value to customers. The term “app” is used to refer to this system. A company’s app is more than just a client-side application. A company’s app includes all client applications and the cloud-based services which support them. It is predicted that competitive pressure will lead many companies not born on the Internet to adopt a new style of app architecture, one which has proven successful for numerous Internet pure plays, including Google and Facebook. It is important for companies to assess their position relative to these trends, and shape their plans for customer relationship management and information technology architecture accordingly. The structure of this paper is as follows:

(Section 2 -Business in Transition: Marketplace to Marketspace) There is a landscape shift in the nature of business as transactions move from taking place in physical space (the marketplace) to taking place online (the marketspace). The conclusion is the marketspace imperative: Companies operating in the marketplace must develop and execute strategies for winning in the marketspace. Winning in the marketspace means gaining leading market share and establishing sustainable competitive advantage in the whole market in which the company competes: whether online or in the physical world.

(Section 3 - On the Path to a Marketspace Strategy) The marketspace is structured as a network of content organized around customers and their value propositions. Winning in the marketspace requires winning this network of content. Competition in the marketspace involves competing at two levels: the level of the individual customer, and the level of the network of all customers.

(Section 4 - Winning a Network of Content: Context Driven Strategy) There is a general strategy for winning a network of content. Call this strategy “Context Driven Strategy.” There is a central idea at the heart of Context Driven Strategy. Winning a network of content requires developing proprietary knowledge about the contents of the network, as well as the intentions, knowledge, and behavior of participants in the network. The fundamental strategic hypothesis: for any network of content, the company that has the best knowledge of what content is most valuable to whom in what context, wins the network. This winning knowledge is called “contextual insight.” Network effects resulting from this proprietary knowledge create sustainable competitive advantage.

There is a deeper strategic pattern by which a company develops and maintains the best contextual insight for their network of content. This strategic pattern is based on three pillars: relationship, monetization and extension. “Relationship” is defined as the company’s ability to deliver value to the customer. “Monetization” is defined as the company’s ability to profit from access to the customer via the relationship. “Extension” is defined as the company’s ability to reach their customers in the context of other companies’ relationships. Google, Facebook, and Amazon have executed this pattern to create value and achieve sustainable competitive advantage in their respective networks of content.

Context Driven Strategy is a way for companies to develop the best contextual insight about their network of content, and thus win that network. The “marketplace imperative” introduced in Section 2 can be rewritten as follows: Companies operating in the marketplace should develop and execute a Context Driven Strategy for winning in the marketplace.

(Section 5 - Executing Context Driven Strategy) Recall that an app is the information system a company uses for delivering value to customers. Successful marketplace companies use their app as the central element in their execution of Context Driven Strategy. From the customer’s point of view, the company’s app is the instantiation of their relationship with the company. In other words, the app is what the customer sees, it is through the app that the customer interacts with the company, and it is the app that maintains the state of the customer’s relationship with the company. From the company’s point of view, the implementation of their app instantiates what they know about the network of content that they must win, and is the channel by which they interact with their customers. For a company seeking to win in the marketplace, every aspect of their app must be geared toward the single goal of increasing contextual insight with respect to their network, by virtue of the pillars of relationship, monetization and extension.

On considering the architectural approaches taken by successful marketplace companies in building their apps to execute Context Driven Strategy, certain key concepts emerge. The term Context Oriented Architecture is introduced to describe architectures which collectively employ these concepts. Six such concepts are introduced, examples of their use described, and explanations of how they support Context Driven Strategy presented. From this discussion it is concluded that companies adopting Context Driven Strategy will in turn come to adopt Context Oriented Architecture for their app. **Context Oriented Architecture is the future of the app.**

(Section 6 - Implications of the Future of the App) Given the findings of this paper, a company should seek to (1) assess their position relative to the marketplace- to-marketplace transition; (2) develop their marketplace strategy; (3) form a tactical plan for executing that strategy; and (4) identify advisers and resources to help with the transition.

Note that there is a Glossary of terms and concepts at the end of the paper.

2. Business in Transition: Marketplace to Marketspace

There is a transition taking place in business: from marketplace to marketspace, that is, from transactions taking place in physical space to transactions taking place online, in the context of relationships mediated by information spaces. This transition was first identified and described by Harvard Business School professors Jeffrey Rayport and John Sviokla in 1994.¹ Rayport and Sviokla argued that the transition was gradual; that both marketplace and marketspace transactions were happening and will continue to happen. However, they claimed that over time, the marketspace will dominate the marketplace. Their claim has been demonstrated in the years since their prediction. Some examples of markets which have already seen this transition are shown below.²

NETFLIX VS. BLOCKBUSTER

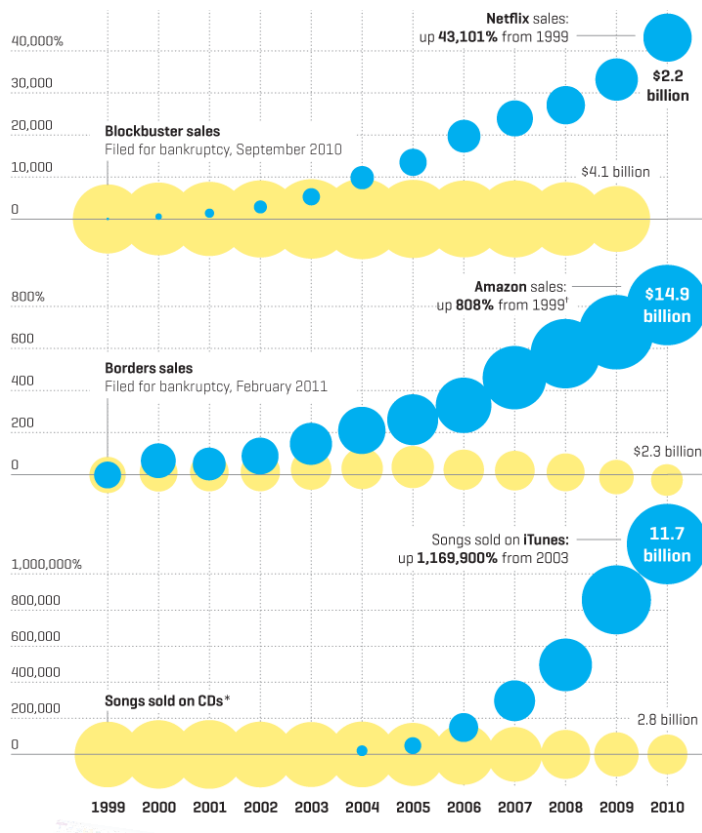
Blockbuster hit 4,000 stores in two decades. Then, in 1997, Reed Hastings got charged a \$40 late fee on *Apollo 13* and founded Netflix. The rest is history.

AMAZON VS. BORDERS

Amazon almost single-handedly bankrupted the No. 2 bookseller in a decade. Barnes & Noble is fighting back with its Nook.

ITUNES VS. CDS

iTunes made its debut in 2003, with devastating effects on music retailers. Tower Records went bust in 2004. Musicland folded in 2006. FYE has shriveled.



Blockbuster
-29% in 5 years

Borders
-40% in 5 years

Songs sold on CDs
-60% in 5 years

Fortune, July 4, 2011. p. 10.

Figure 1 - Marketplace to Marketspace

¹ Jeffrey Rayport and J.J.Sviokla, “[Managing in the Marketspace](#),” *Harvard Business Review*, November 1994. The professors were quite prescient, as at that time there were only 20 million people on the Internet.

² Note how a marketplace company can seem to be holding its own for a number of years, and then is suddenly overwhelmed by a marketspace competitor. Also note that as sales dropped, profitability declined for both [Blockbuster](#) and [Borders](#).

The transition from marketplace to marketspace is a major disruption. The cause of the disruption is a fundamental change in the nature of the interface between a company and its customers. In the transition, all of the processes by which products and services are constructed, marketed, purchased, and delivered change. This disruption started with pure content businesses, but the general adoption of the Internet and mobile computing will extend it to more businesses over time. Companies need to understand what the transition means and must plan their future strategy to master the transition and thrive in the emerging marketspace. To understand the transition, consider the following diagram from Rayport and Sviokla's article (Figure 2 - From Marketplace to Marketspace).

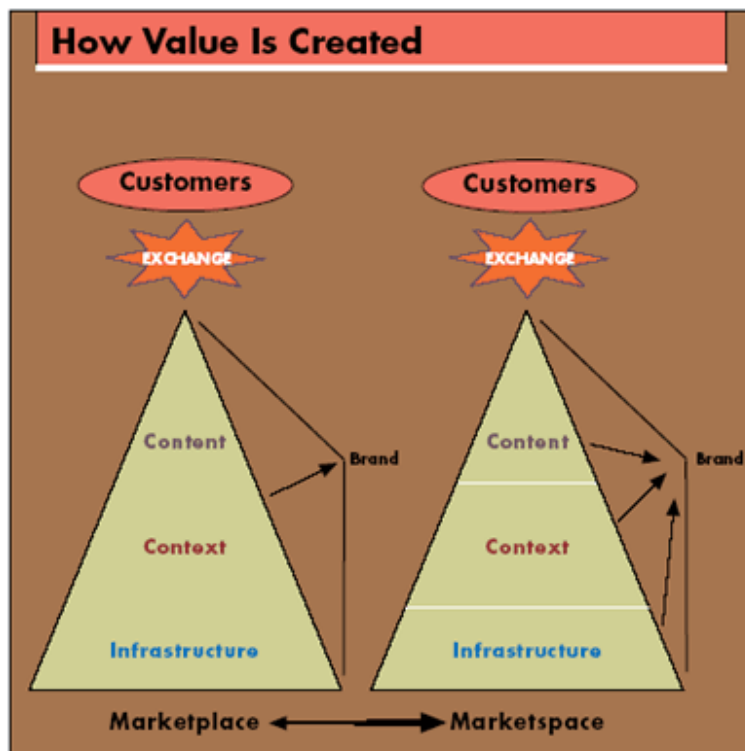


Figure 2 - From Marketplace to Marketspace

In the marketplace (the pyramid on the left), companies provide an integrated value proposition to customers. There is a single distribution chain for the entire value proposition as perceived by the customer. In the diagram, the customer value proposition is shown divided into three elements: content, context and infrastructure; with the following rough definitions:

- Content – what is being offered.
- Context – how it is being offered.
- Infrastructure – what enables transactions to occur.

As an example of a marketplace transaction, consider a telephone call made in the 1980s. The content is the call. The context is the telephone and the phone service provided by the phone company. The infrastructure is the telephone network.

In the market space (the pyramid on the right), the value proposition is reconfigured. It becomes possible for content, context, and infrastructure to be provided by different players, in a variety of combinations. It is important to note is that the same element can play the roles of both content and context.³ This is easiest to understand with an example.

Consider someone using their smartphone today. They are reading their Facebook feed and begin to watch a video posted by one of their friends. At one level, the content is the video and the context is Facebook. At the next level down, one can see Facebook as content, and the phone operating system as the context. Then there is a further level at which the operating system is content, and the relationship with the mobile operator is context. Grounding all that is the infrastructure (devices and network) that makes all the levels of content and context possible. See Figure 3 below.

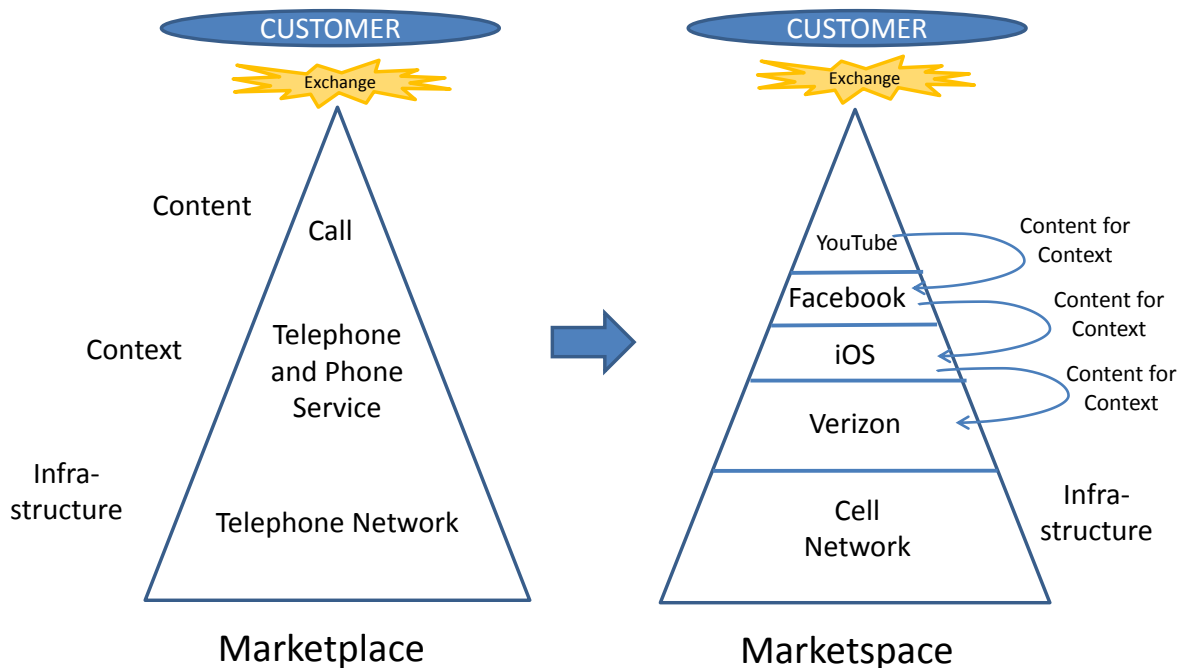


Figure 3 - Marketplace to Marketspace Example

This reconfiguration fundamentally challenges the long term success of the phone company (now known as “mobile operator,” a shift in names that reflects the change in role). The mobile operator is being separated from the customer. The new configuration of content, context and infrastructure enables new players (like Facebook and Apple) to enter the market and provide elements of the customer value proposition. In so doing, these new players take over more valuable contextual territory closer to the customer. As Rayport and Sviokla discuss, an important aspect of market space strategy is that customer loyalty is grounded at the level of context. In the example just described, it could be argued that

³ This is an extension of Rayport and Sviokla’s model. It reflects Marshall McLuhan’s concept that the content of one medium is another medium; for example, the content of TV is film, or the content of film is theater. See Marshall McLuhan, Understanding Media: The Extensions of Man (1st Ed. McGraw Hill, NY, 1964).

customer loyalty is strongest at the level of the Facebook context, to a lesser degree at the phone operating system context, and very little at the mobile operator context. Because of this, the mobile operator is threatened by the possibility of being reduced to a commodity provider of bandwidth, with correspondingly low margins and high customer churn.

The result is the marketplace imperative. **Companies operating in the marketplace must develop and execute strategies for winning in the marketplace.** Winning in the marketplace means gaining leading market share and establishing strategic competitive advantage in the whole market in which the company competes: whether online or in the physical world.⁴

Different markets will transition from marketplace to marketspace at different times. Every company needs to assess its own market to see when the change is likely to happen, and to plan its strategy relative to that assessment.

3. On the Path to a Marketspace Strategy

What does it take to win in the marketspace? Consider the description of the marketspace above. In Rayport and Sviokla's view, a marketspace customer meets their needs by entering into a relationship with a company that provides them with a context for consuming and producing content. This view highlights two key aspects of the marketspace. First, marketspace transactions are generated in the context of 1:1 relationships between companies and customers. Second, those relationships involve a company gathering and interpreting content on behalf of its customer, and vice-versa: that is, the customer is engaged in a process of co-creating value with the company. The game-changing paradigm is that a company builds a shared relationship with its customers, in the course of which transactions take place. One could think of this relationship as a kind of conversation.⁵

This way of understanding the marketspace is reflected in a conceptual framework described by University of Michigan business school professors (the late) C.K. Prahalad and M.S. Krishnan. In their words:

“There is a fundamental transformation of business underway... This transformation is ... built on two basic pillars:

1. Value is based on the unique personalized experiences of consumers. Firms have to learn to focus on one consumer and her experience at a time, even if they serve 100 million consumers. The focus is on the centrality of the individual. We will designate this pillar as N=1 (one consumer experience at a time).

⁴ Mobility and mobile-enabled technologies such as tagging are breaking down the barriers between the online and the physical. For a discussion see J. Sviokla “[How Barcodes and Smartphones Will Rearchitect Information](#),” Harvard Business Review Blog Network, June 28, 2010.

⁵ This concept of markets as conversations was discussed in [The Cluetrain Manifesto](#) by Rick Levine, Christopher Locke, Doc Searls, and David Weinberger, Basic Books, 1999. See Chapter 4.

2. No firm is big enough in scope and size to satisfy the experiences of one consumer at a time. All firms will access resources from a wide variety of other big and small firms – a global ecosystem. The focus is on access to resources, not ownership of resources. We will designate this pillar as R=G (resources from multiple vendors and often from around the globe).”⁶

Further, they claim this approach is not limited to B2C companies. As companies shift from products to services, any customer relationship requires one-to-one attention. “In the new competitive arena of one customer at a time and global networks of resources, B2B and B2C definitions converge.”⁷

Prahalad and Krishnan’s concept of N=1 is a restatement of an idea presented in 1996 by marketing experts Don Peppers and Martha Rogers in their groundbreaking work [The One to One Future](#).⁸ In that book, Peppers and Rogers introduced the concept of “share of customer,” and explained ways in which business strategies organized around relationship management enable higher profitability than strategies organized around products or transactions.⁹ Prahalad and Krishnan take the one-to-one idea of Peppers and Rogers to the next level by adding to it the importance of the network of relationships.

To better understand the application of Prahalad and Krishnan’s ideas to the problem of winning in the marketplace, consider the following diagram (Figure 4 - A Marketplace View of the Customer Relationship). This diagram shows a simplified view of a customer relationship from the point of view of the company. The company must gather and select content from a global ecosystem of resources (the top blue triangle labelled “content”). This content may include products and services. The company interprets this content in the context of its relationship with the customer (the green circle). Then the company must deliver the contents of its relationship with the customer in the global set of contexts where the customer could be (the yellow triangle labelled “contexts.”)¹⁰

To make the example tangible, consider Netflix. Netflix aggregates content across a wide range of video providers. Of the tens of thousands of entertainment possibilities, Netflix uses a model of each customer, their history and ratings, to select what they consider to be the most valued options for that

⁶ C.K. Prahalad and M.S.Krishnan, [The New Age of Innovation: Driving Cocreated Value Through Global Networks](#), McGraw Hill: New York, 2008, p.11.

⁷ Ibid. p. 17. For a B2B example, the authors put forth [the example of Bridgestone Tire](#). Bridgestone Tire no longer sells tires to trucking companies, they sell tire-miles. To do so, Bridgestone needs to build a detailed model of each customers’ fleet of trucks and their use; maintain “relationships” with each of the drivers, trucks and tires; and use that model to deliver their “tire service” most effectively.

⁸ Don Pepper and Martha Rogers, [The One to One Future](#), Currency/Doubleday: New York, 1996.

⁹ Bain & Co. partner Darrell Rigby presents one form of the N=1 concept as “omnichannel retailing” in a recent paper. See Darrell Rigby, [“The Future of Shopping,” Harvard Business Review](#), December 2011.

¹⁰ The split of R=G into content and contexts is an extension of Prahalad and Krishnan’s model. A similar diagram is used in the paper “What is Your Digital Business Model” by Peter Weill of the MIT Center for Information Systems Research, September 2011.

one customer.¹¹ These recommendations are delivered in the context of the customer relationship, and it is in the context of that relationship that the customer makes their selections. The history of interaction with the service is recorded, and used to influence future interactions. The Netflix customer relationship is delivered through a wide variety of mechanisms, including hundreds of devices, such as TVs and phones, and services like Xbox Live, Apple TV, and Google TV. All these mechanisms are contexts in which customers can experience their Netflix relationship.

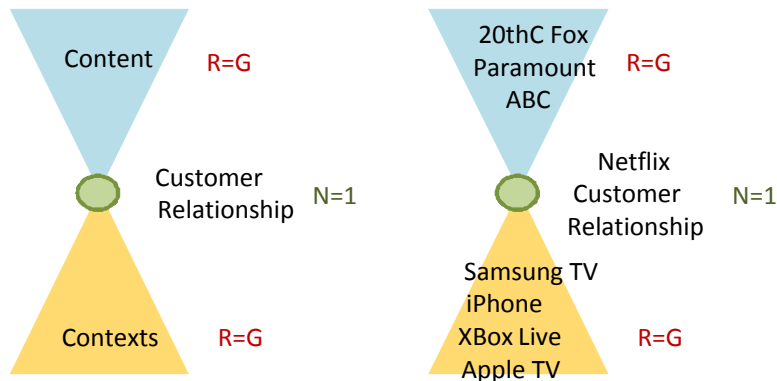


Figure 4 - A Marketplace View of the Customer Relationship

Prahalad and Krishnan’s proposed shift is from a model of business based on a “firm” with clear boundaries and independent products to a model where an organization is at the center of a network of customers and partners, and value is co-created by all the participants in the network. The firm seeks to create the strongest such network with the intent to capture as much of the co-created value as it can. From this perspective, every company is at the center of its own network of content. That network is structured around customers and their value propositions (which correspond to the services they consume). So, in a first approximation, the picture of the network of content for the company looks something like Figure 5 below.

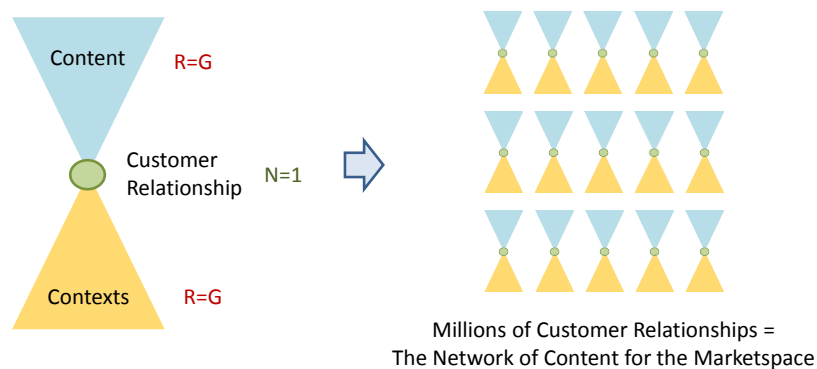
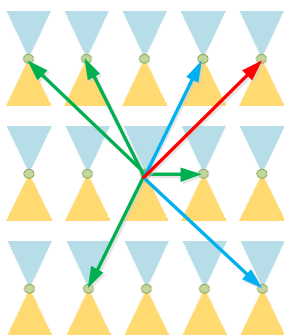


Figure 5 - The Structure of the Marketplace (take 1)

¹¹ Note that Netflix aggregates ratings by account not individual person within an account.

The next step to consider is that the customers have relationships to each other (and to other entities, such as the products they consume or buy). Those relationships also become part of the network.



Millions of Customer Relationships and
their Interconnections =
The Network of Content for the Marketplace

Figure 6 - The Structure of the Marketplace (take 2)

This understanding of marketplace structure allows us to state a key principle of marketplace strategy. **Winning in the marketplace requires winning a network of content organized around customers and their value propositions.** As Rayport and Sviokla forecast, and as Prahalad and Krishnan describe, the nature of business competition is fundamentally shifting. Instead of products or stores, the locus of competition has moved to individual customer relationships situated in a network of such relationships.

In the marketplace, companies compete at two levels. On one level they are competing for customers, one customer at a time. On a higher level, they are competing at the level of the network of all customers in the market. These two levels support each other via network effects, where more interaction by a customer with a company's service increases the value of the service for other customers.¹²

Netflix is an example of this network based competition. Each customer rates movies, and indicates preferences by their selection of movies. Netflix uses information aggregated across all customer interactions to make recommendations to individual customers of what movies they might like. The more customers who use Netflix, the better the recommendations that Netflix can give to each customer.

Amazon is another example. Amazon aggregates a global array of products, and delivers them in the context of 1:1 relationships with each customer. Each customer executes searches, looks at products, and makes purchases. Amazon uses information aggregated across all customer interactions to make recommendations to individual customers. For each customer, their Amazon relationship is available wherever they want access, even within the physical stores of Amazon's bricks-and-mortar competitors. Amazon uses the power of their network to increase the value of each individual customer relationship.

¹²For further discussion of network effects, see the [page on the topic](#) by Arun Sundararajan, a professor at NYU.

This two level nature of marketspace competition, where companies compete at the level of individual customers, and at the level of the network of all customers, is general to all marketspaces. It has been pioneered by Internet pure plays but is not specific to them. To win in their respective marketspaces, companies across the economy need to learn how to compete in this way.¹³

This raises the question: how does a company win a network of content organized around customers and their value propositions? That is, how do they maximize market share and achieve sustainable competitive advantage with respect to the network of content for their market?

4. Winning a Network of Content: Context Driven Strategy

4.1 Context Driven Strategy Defined

To answer these questions, it is helpful to look at the experiences of companies that have demonstrated success at winning networks of content organized around customers and their value propositions. Consider the strategies of Google and Facebook. Through its search application, Google won the network of pages that comprise the Web. Google has become essential to the process of using the Web. Google has realized significant value from the Web via search and advertising (market cap: \$189 billion¹⁴ and revenue: \$21.8 billion in 2008, \$23.7 billion in 2009, \$29.3 billion in 2010 for a CAGR of 16% from 2008 to 2010¹⁵), and has achieved sustainable competitive advantage with respect to that network. Through its social networking application, Facebook won the network of people linked by social relationships. For millions, and especially the younger generation, Facebook has become a primary means of communication. Facebook has realized significant value from social networking (market cap: \$100 billion (est)¹⁶ and revenue: \$0.74 billion in 2009, \$1.86 billion in 2010, an estimated \$4.05 billion in 2011, and an estimated \$5.74 billion in 2012 for a CAGR of 98% from 2009 to 2012¹⁷), and has achieved sustainable competitive advantage with respect to the social network. By looking at the strategies of Google and Facebook, the elements of a general strategy for winning a network of content organized around customers and their value propositions can be identified. Call this general strategy “**Context Driven Strategy**.” Following a discussion of the high level elements of the strategy, the ways in which the pattern is reflected in the cases of the two companies will be discussed.

There is a single idea at the center of Context Driven Strategy. **Winning a network of content requires developing proprietary knowledge about the contents of the network, as well as the intentions, knowledge, and behavior of participants in the network.** This knowledge is fundamentally contextual,

¹³ A resource for thinking about marketspace strategies is the project on [Digital Business Models](#) at the MIT Sloan Center for Information Systems Research led by Professor Peter Weill.

¹⁴ as of 11/29/2011.

¹⁵ Google.com [Financial Tables](#).

¹⁶ Shayndi Raice, “[Facebook Targets Huge IPO](#),” *Wall Street Journal*, 11/29/2011.

¹⁷ *Ad Age*, “[Estimate Facebook books 1.86 Billion in 2010 Advertising, Muscles in on Google’s Turf](#),” 1/17/2011. Numbers from eMarketer.

that is, it is about the contents of the network from the points of view of participants in the network. The fundamental strategic hypothesis is as follows: **For any network of content, the company that owns the best knowledge of what content is most valuable to whom in what context, wins the network.** Call this winning knowledge, “**contextual insight.**” Network effects resulting from this proprietary knowledge create sustainable competitive advantage.

Now the key question has shifted. Instead of “how does a company win a network of content organized around its customers and their value propositions,” the key question becomes “how does a company develop and maintain the best contextual insight for its network of content?” And for that there is a deeper strategic pattern. This pattern can be seen in the strategies of Google and Facebook, and as well in a large number of other pure market-space success stories. For other examples, see the Appendix Section 8: Market-space Network Winners.

This deeper strategic pattern is based on three pillars: relationship, monetization, and extension.

These terms are defined as follows.

- **Relationship** is the company’s ability to deliver value to the customer.
- **Monetization** is the company’s ability to profit from access to the customer via the relationship it has with the customer.
- **Extension** is the company’s ability to reach their customers in the context of other companies’ relationships.

The concept of extension may require a bit more explanation. As will be seen, gaining and profiting from the best contextual insight requires being everywhere the company’s customers could gain value from access to their relationships with the company. Much of the time, those customers will be in the context of their relationships with other companies. Finding ways to deliver value in those contexts is what extension is all about. A Facebook social plug-in (e.g. a box on the New York Times home page listing articles a person’s Facebook friends liked on nytimes.com) is an example of Facebook extending itself into the relationship between their customer and the New York Times.

These three pillars relate directly to the structure of the market-space described in the previous section. As will be seen, all three drive, and are driven by, contextual insight. Delivering valued content at the right time and in the right way is key to relationship. Understanding what is valuable to the customer guides what, when, and how to sell. Understanding what the customer could need given where they are in their other relationships is the essence of extension.

The discussion of Google and Facebook below shows how these three pillars work together to enable a company to develop better contextual insight than its competitors. It also demonstrates how the

network effects of these pillars create value and sustainable competitive advantage for the company which best executes on achieving them.¹⁸

4.2 Google’s Strategy for Success in the Web (the Network of Pages)

The diagram below (Figure 7 - Google's Context Driven Strategy), shows the structure of Google’s strategy for success in the Web (the network of Web pages). The strategy is anchored in the three pillars of relationship, monetization and extension. For each pillar, a rough description of the contextual insight which drives success on that dimension of the strategy is given, and the key mechanisms which Google uses to implement it are identified.¹⁹

Google’s Strategy to Win the Network of Pages

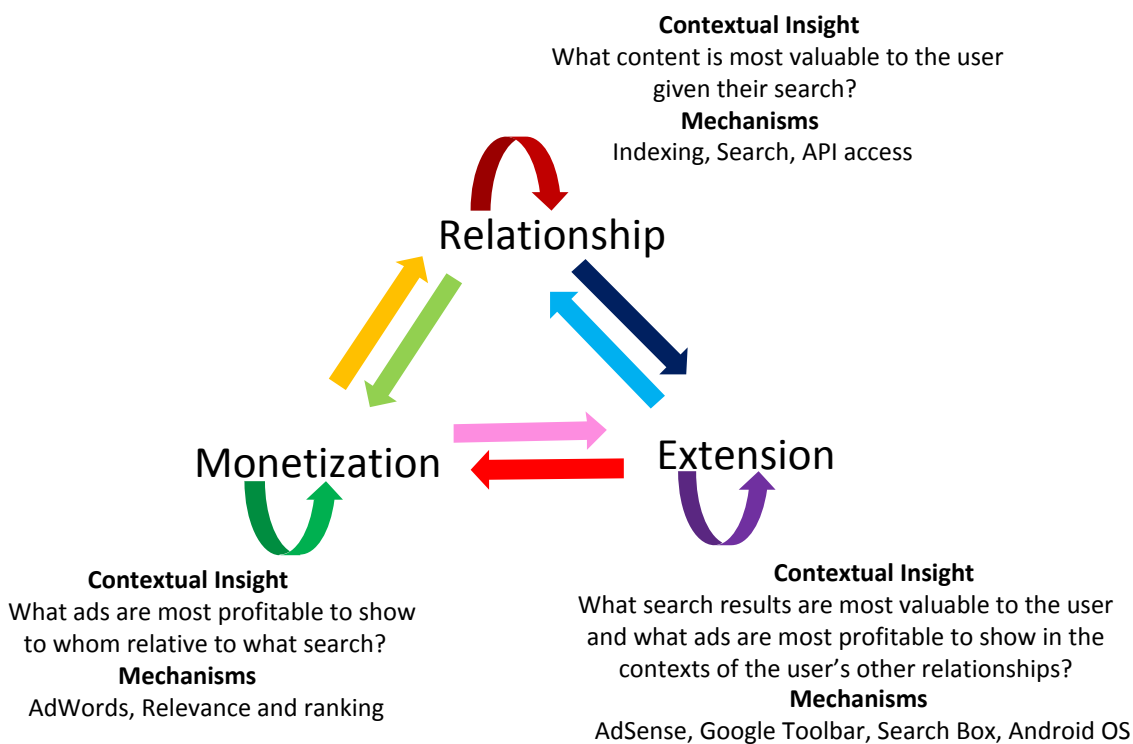


Figure 7 - Google's Context Driven Strategy

All three strategic pillars work together in a holistic and mutually supporting system of network effects. Briefly those effects can be explained as follows. Below, X->Y indicates how pillar X supports pillar Y.

¹⁸ For an insightful and detailed discussion of how a company has applied a Context Driven Strategy to win in multiple marketspaces, see the recent presentation about Amazon developed by Stéphane Distinguin, CEO of consultancy [faberNovel](#). Stéphane Distinguin, [Amazon.com:the Hidden Empire](#), faberNovel, May 2011.

¹⁹ This section draws on ideas and data presented by [Prof. Susan Athey](#) of Harvard University.

- Relationship → Relationship: Good search results yield more searches which in turn yield better search results. For example, research data show that search platforms with larger volumes are better able to deliver relevant results for less frequently issued search requests.
- Relationship → Monetization: More searches mean more ad presentations and better matching of ads to keywords. Larger search platforms have higher revenue per search. It is not assumed that revenue is directly determined by volume, just that the two measures are positively correlated.
- Monetization → Relationship: Better monetization increases the relevance of ads to user intent.
- Monetization → Monetization: Better monetization draws more ad inventory enabling better monetization.
- Monetization → Extension: Revenue from monetization can be shared with partners to drive extension. For example, Google dominates search syndication. Publishers of large content sites choose Google to run their search functions. This is driven by Google's ability to pay more per search to those sites incorporating a Google search box. Google has driven the adoption of the Android OS by the offer of shared search revenues to handset makers.²⁰
- Extension → Monetization: Extension drives more traffic for ad display.
- Relationship → Extension: Demand for Google search drives desire to integrate by a partner, as a way to increase the value of the partner's relationships with their customers.
- Extension → Relationship: Google search being available everywhere, strengthens the user's relationship with Google.
- Extension → Extension: Google search becomes an expected feature everywhere.

4.3 Facebook's Strategy for Success in the Social Network (Network of People)

The diagram below (Figure 8) sketches the structure of Facebook's strategy for success in the Social Network (the network of people). As with Google, the strategy is anchored in the three pillars of relationship, monetization and extension. For each pillar, a rough definition of the contextual insight which drives success on that dimension of the strategy is given, and the key mechanisms Facebook uses to implement it are identified.

²⁰ Bill Gurley, abovethecrowd.com, "[Google Redefines Disruption](#)" and "[The Freight Train that is Android.](#)"

Facebook's Strategy to Win the Network of People

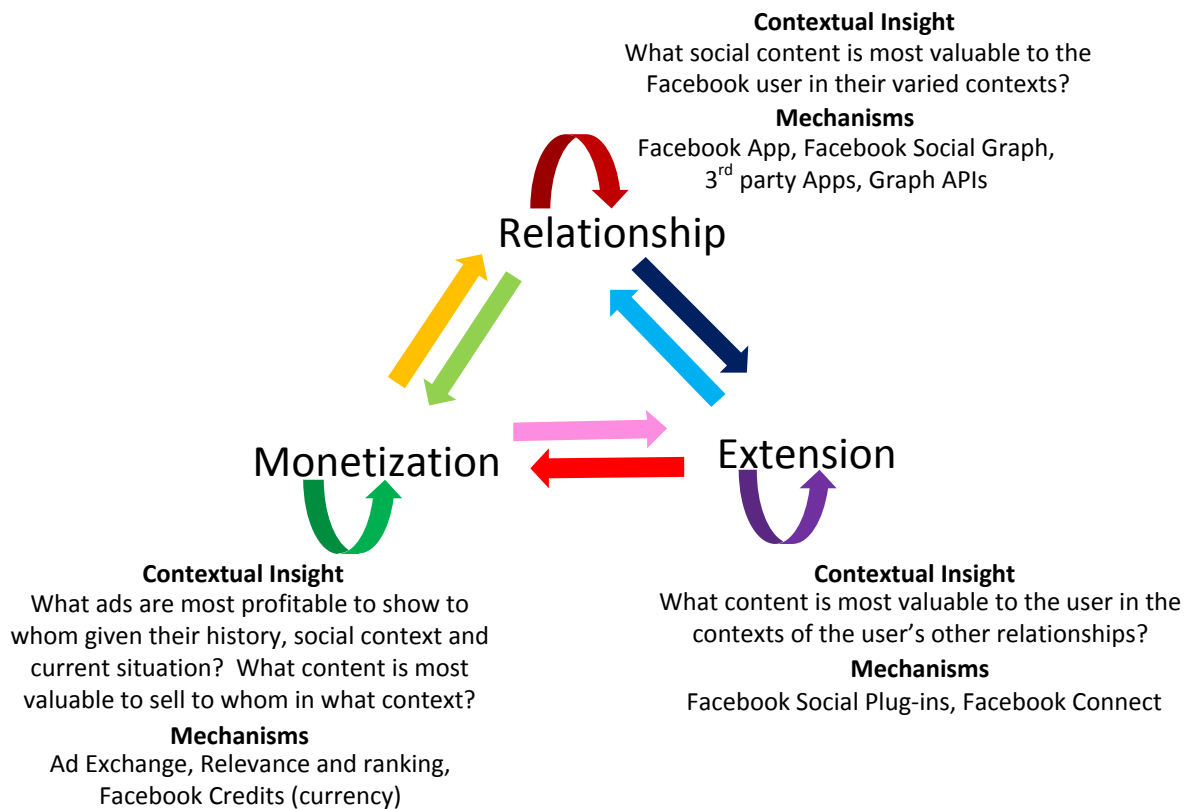


Figure 8 - Facebook's Context Driven Strategy

As in the case of Google, all three strategic pillars work together in a holistic and mutually supporting system of network effects. Those effects can be explained as follows. As before, X->Y indicates how pillar X supports pillar Y.²¹

- Relationship → Relationship: Valued social experience yields more interaction and usage, which yields better social experience.
- Relationship → Monetization: More usage means more ad presentations and better matching of ads to keywords. More data in personal and social context enables better selection of ads. Apps draw interaction which generates sales of content for credits.
- Monetization → Relationship: Better monetization increases the relevance of ads to user intent, and draws more apps enhancing user experience.

²¹ The discussion in this section covers how Facebook has come to the place they are presently. The recent [presentation by Mark Zuckerberg at Facebook F8](#) outlines how Facebook is planning to take their present model into the future. That presentation shows that the next generation of Facebook is a recommitment to the general context driven strategy described here. Timeline, Open Graph, frictionless sharing, etc. are all ways of taking Facebook's relationship, monetization and extension to the next level, enabling and applying greater contextual insight than they have today.

- Monetization → Monetization: Better monetization draws more ad and app inventory enabling better monetization.
- Monetization → Extension: The primary mechanism for extension to date has been the Facebook social plug-in. These plug-ins, e.g. the “Like” button, or the widget that shows you what your friends “liked” at the site you are on, spread the Facebook experience throughout the Internet. Websites present these plug-ins as part of their own experiences. The latest form of social plug-in can be seen in the integration of Facebook into Bing search.²² To date, there has been so much value for partners from adopting Facebook social plug-ins that Facebook hasn’t had to share revenue in order to gain massive extension. Today 2.5 million websites use social plug-ins to integrate with Facebook; including 80 of Comscore’s US top 100, and over half of Comscore’s global top 100. 250 million people engage with Facebook on external websites.²³ In the future revenue from monetization may be shared with extending partners. Examples include the use of Facebook currency and showing Facebook ads in partners’ contexts.
- Extension → Monetization: The social plug-ins give Facebook information on what their members are doing outside Facebook (a source of knowledge), and what they find valuable there. The data from extension enable better monetization.
- Relationship → Extension: As seen above in Monetization->Extension, the customer’s relationship with Facebook is so valuable to partners that they incorporate Facebook social plug-ins into their experience either for free or by paying Facebook. Value is generated in two ways. First, relevant data can be extracted from the customer’s Facebook relationship. Second, data can be published back into the customer’s Facebook relationship, and through that to the customer’s friends.
- Extension → Relationship: Facebook plug-ins everywhere strengthen the relationship between Facebook and the customer.
- Extension → Extension: Facebook social plug-ins become an expected feature everywhere.

4.4 The Marketplace Imperative Redefined

The above discussion demonstrates that Context Driven Strategy is a proven way for companies to develop the best contextual insight about their network of content, and thus win that network. This allows us to reformulate the “marketplace imperative” which was introduced in Section 2. **Companies operating in the marketplace, should develop and execute a Context Driven Strategy for winning in the marketplace.** This sets up the next question. What is the best information systems architecture to execute a context driven strategy?

²² ReadWriteWeb.com, “[Bing Debuts Social Search with New Facebook Integration](#),” 5/16/2011.

²³ <http://www.facebook.com/press/info.php?statistics> as of 8/10/2011.

5. Executing Context Driven Strategy

Recall that an app is defined as the information system companies use for delivering value to customers. Successful marketplace companies use their app as the central element in their execution of Context Driven Strategy. From the customer's point of view, the company's app is the realization of their relationship with the company. In other words, the app is what the customer sees, it is through the app that the customer interacts with the company, and it is the app that maintains the state of the customer's relationship with the company. From the company's point of view, the implementation of their app realizes what they know about the network of content which they must win, and is the channel by which they interact with their customers. For a company seeking to win in the marketplace, every aspect of their app must be geared toward the single goal of increasing contextual insight with respect to their network, by virtue of the pillars of relationship, monetization and extension.

On considering the architectural approaches taken by successful marketplace companies in building their apps to execute Context Driven Strategy, certain key concepts emerge. The term **Context Oriented Architecture** is used to describe architectures which collectively employ these concepts. In this section, six such concepts are introduced, examples of their use described, and explanations of how they support Context Driven Strategy presented. From this discussion it is concluded that companies will come to adopt Context Oriented Architecture for their app.

5.1 Concept 1 – Organize around one to one relationships

The goal in Context Driven Strategy is to win a network of content organized around customers and their value propositions. As a result, a company executing Context Driven Strategy organizes their app architecture around representations of each customer relationship. In interpreting the diagram below, recall that the blue triangle reflects content, the green circle the relationship, and the yellow triangle the contexts through which the relationship is delivered.

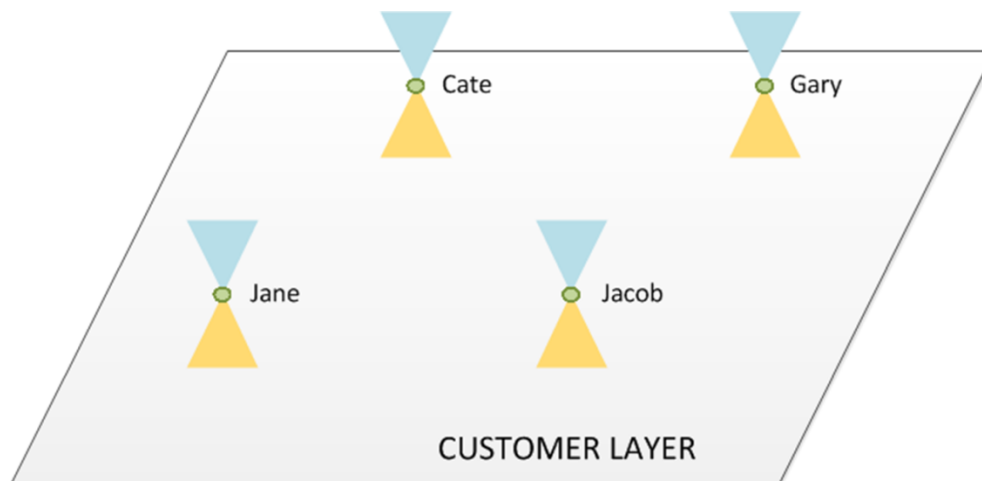


Figure 9 - One to one relationships

For example, for each customer, Netflix maintains a profile, their ratings of movies they have watched, their viewing history, recommendations for future viewing, and where they are in the movies they are currently watching. For each customer, Amazon maintains a profile, their browsing history, their purchase history, their open orders, and their current shopping cart. Facebook maintains for each customer a profile, their list of friends, a wall on which they and their friends can post, a feed of what their friends have been doing, a place for them to post photos, and so on.

Organizing around the customer helps companies execute on all three pillars of Context Driven Strategy.

- Relationship. Delivering maximum value to each individual customer drives the need for a unified model of each customer's situation and point of view.
- Monetization. Unified representations of customer relationships enable opportunities for accessing customers to be packaged, sold and consumed effectively. This is especially important as marketing shifts from placement next to content to communicating with individuals.²⁴
- Extension. Access to the company-customer relationship is required to provide value to the customer in the contexts of their relationships with other companies.

Executing the concept of one-to-one relationships requires that the company be able to scale its app to handle very large numbers of customer relationships.²⁵

5.2 Concept 2 – Aggregate and analyze globally, interpret locally

Successful marketplace companies use this approach to leverage the information advantage of having a computationally accessible model of all their customer relationships. The first part of the concept is to aggregate data globally across customers, analyze it, and derive insights. The second part of the concept is to then apply these insights locally in the context of individual customer relationships. This process of aggregation, analysis, and interpretation is essential to developing contextual insight, and is central to executing all three pillars of Context Driven Strategy. See Figure 10 for an illustration.

For example, consider Netflix. As the amount of available content becomes larger and larger, the ability of each customer to find the content they value becomes increasingly important. Netflix uses the analyzed results of aggregate information across its customer base to give each customer a personal "star rating" for every movie in its catalog. These personal ratings make it easier for customers to find what they want to watch. The ratings improve the relationship between the customer and Netflix, and build a barrier to switching to another provider. They also improve Netflix' ability to monetize less well

²⁴ A recent article in the Economist explained how advertising is shifting from site-specific ad buys toward real-time bidding, where advertisers bid to reach a known audience in certain contexts. The article concludes "In short, content is no longer king online. Information about the user is what really matters." "[Mad Men are Watching You](#)," *The Economist*, 5/7/2011, p. 67.

²⁵ Note that Netflix' recent decision to split their customer relationships in two (streaming and DVD) violated the 1:1 principle. After great customer outcry and a significant loss in shareholder value, the decision was rescinded.

known (and less expensive) content. Analysis interpreted in individual situations improves profitability of the “long tail” of content, for Netflix as it does for Google.²⁶

In a similar way, Amazon uses the analyzed results of aggregated data to help shoppers find valued products with personal recommendations such as “you may be interested in x,” and helpful information such as “customers who bought x also bought y” or “customers who looked at x also looked at y.” As another example, Amazon uses aggregated data to determine in what order to display search results. The first display of results is always ordered by an Amazon computed “relevance.” This custom computed relevance improves relationship by shortening the time from search to result, and monetization by showing more profitable items earlier. As with Netflix and Google, Amazon’s analysis enables more effective monetization of the long tail of products.

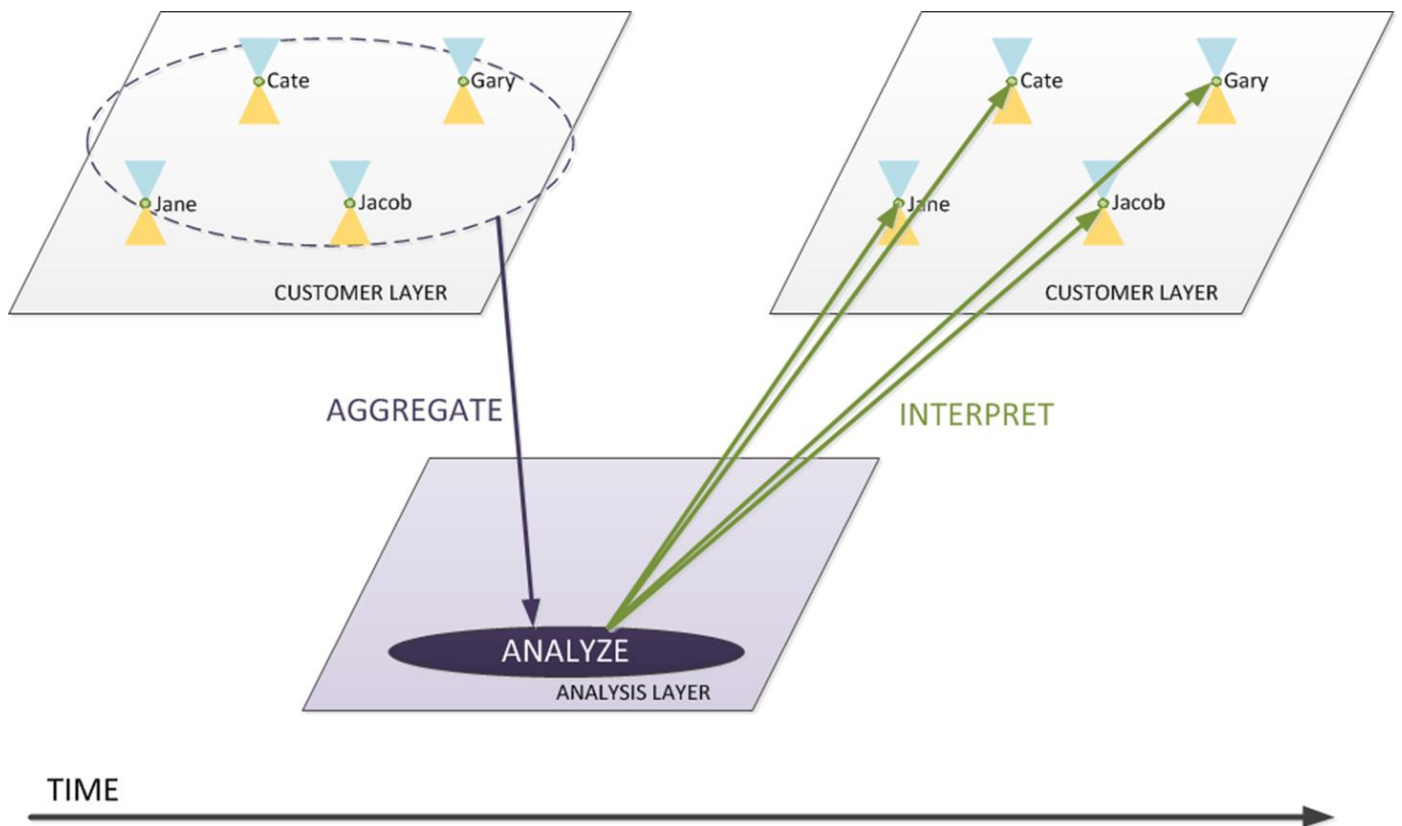


Figure 10 - Aggregate and analyze globally, interpret locally

An example of analysis supporting extension will be provided in the description of the next concept. Executing the concept of global aggregation and analysis with local interpretation puts special scale demands on a company’s app. In a competition to win a network of content, the amount of

²⁶ Direct evidence for the effectiveness of the recommendations is difficult to find. Netflix does have a high churn rate. See this [blog post](#).

aggregation, analysis and interpretation is not fixed. It makes sense to carry out aggregations, analyses and interpretations to the degree that the eventual value of the computation exceeds the cost, and that the computations are ordered so that more profitable computations are carried out first. This means that to win, a company's app must be able to scale aggregation, analysis and interpretation more effectively than the apps of its competitors.

It is not in general possible to predict in advance what aggregations, analyses, or interpretations will be most valuable for customers or the company. It is important to have all customer data accessible for aggregation and analysis; and to have a way to store the results of analysis so that they can become a source for the next round of analysis.

5.3 Concept 3 – Leverage relationships between customers

In general, the needs and behavior of customers are not independent. Many successful marketplace companies seek to better understand and serve their customers by applying knowledge of how their customers relate to one another. They do this by extending the model of all customers to include representations of the relationships between those customers. See Figure 11. For example, Facebook models the relationship of one person being the friend of another. LinkedIn models many kinds of relationships between people, such as, that Jane is a colleague of Jacob, that Jane worked with Gary in the past, or that Cate knows Jane. Twitter models who is following whose feed.²⁷

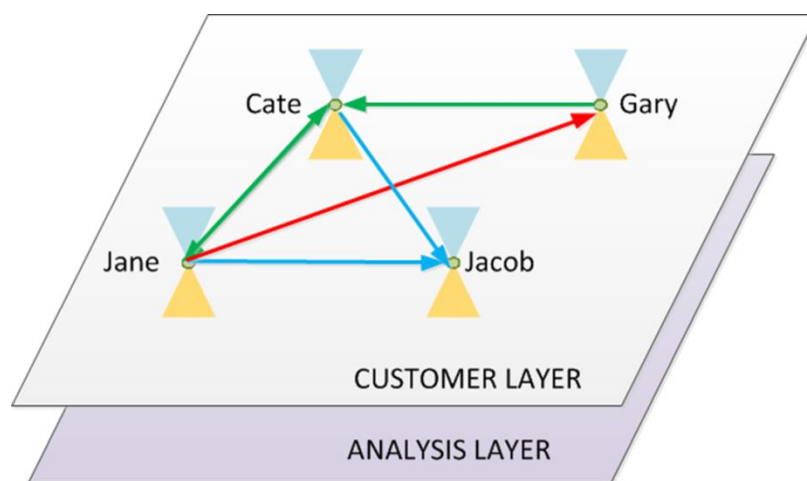


Figure 11 - Relationships between customers

Modeling relationships between customers increases the value of the models of individual customer relationships in several ways. Relationships in the company's model are a partial view of actual relationships in the real world. Modeling inter-customer relationships enables the company to prompt customers to give the company more detailed information about their actual relationships, as is seen with Facebook or LinkedIn's use of "you may know" questions. Customers get value from forming new

²⁷ In [eMarketer's first full forecast for the company](#), they expect Twitter to attract \$150 million in advertising this year and \$250 million in 2012.

relationships that they discover through the company's network model. This is a key value provided by LinkedIn.

Further, modeling inter-customer relationships enables the company to improve the quality of content each customer receives through analytic methods such as collaborative filtering or collaborative recommendations. For example, Facebook uses such analysis to decide what content from a customer's social network is most important to show on that customer's Feed or home page. Since the amount of content which could be shown is huge, Facebook's ability to do this well is a key part of their app's value to the customer. Modeling inter-customer relationships also gives customers the added value of being able to easily share content with related persons, as when a Facebook user posts to their Wall.

Relationship modeling supports monetization by enabling better prediction of customer behavior, and encouraging person to person marketing. Relationship modeling also supports extension. In any context where the customer may be, knowing what related customers did when they were in a similar situation, becomes valued content in that context. The Facebook social plug-ins are a prime example.

Executing the concept of relationships between customers requires that the company's app be able to scale the number and kinds of relationships which can be represented.

5.4 Concept 4 – Model relationships using composition and connection

5.4.1 The need to extend and deepen customer relationships

As discussed in Section 5.1, Context Driven Strategy depends upon the company managing unified models of individual customer relationships. For most companies, successful execution of the strategy further depends upon the company's ability to continually extend and deepen their relationships with their customers. More content and more interaction in the company-customer relationship improves all three pillars of Context Driven Strategy.

- Relationship. The more the company knows about each customer and their needs, the better they can satisfy customer needs across the network.
- Monetization. The company can monetize more effectively through better understanding of the customer's point of view and an increased number of better defined opportunities for selling to the customer.
- Extension. More content and interaction make the company-customer relationship more valuable in other companies' contexts.

There is an additional competitive motivation. If the company stops extending its relationship with the customer, other companies could come along, provide more value, and take the customer away.

5.4.2 General problem

There are two primary challenges to increasing the depth of company-customer relationships: complexity and scale.

There are two sides to the challenge of complexity: from the perspective of the company, and the perspective of the customer.

The company must find ways to add capability without getting bogged down. It must be possible to evolve existing capabilities or add new ones, quickly and in parallel. The pace of development and deployment must be able to scale up rapidly.

On the customer side, each customer must be able to extend the capabilities they are using as part of a continuous experience. They need to be able to pick and choose the new capabilities they want. Those new capabilities need to fit into the experience they already have. The company wins to the degree that the customer can keep adding new capabilities and feel that the experience is getting better at the same time.

A second challenge to increasing the depth of company-customer relationship is scaling up the amount of computation being carried out to provide all the offered capabilities.

5.4.3 A standard solution: composition of services using Service Oriented Architecture

How could a company meet the challenges just outlined? A standard answer from modern enterprise architecture would be: use a Service Oriented Architecture. **A Service Oriented Architecture organizes computation by function.** Service Oriented Architecture simplifies implementing and managing a complex app by decomposing it into multiple component services which may be evolved independently. In a Service Oriented Architecture, for each aspect of functionality, a different service is implemented. Each service offers a Service Interface (perhaps with REST and WS-* protocol heads). The implementation of each Service is encapsulated within such an interface. All communication between services takes place via messages. To improve integration between services, companies utilizing Service Oriented Architecture typically implement an Enterprise Service Bus regularizing and managing the flow of messages between services.

For example, consider the Facebook app. One way to understand the Facebook app is as a collection of services, including, for instance,

- a Profile service, managing user profiles and sets of friends;
- a Feed service, managing the news feed for each user;
- a Photo service, managing Photo Albums and Photos for each user; etc.

If Facebook was to have adopted Service Oriented Architecture, their implementation might have (partially) looked something like the below (see Figure 12). In the diagram, three services are shown (Profile, Feed, and Photo and Albums). Each service has some procedural implementation (shown by the rectangle), and some state (shown by the individual database cylinders). Each service has its own interface, and all services are connected by a Service Bus. This partial diagram shows the data for two people (Jane and Cate). Each person has a Profile and a news Feed. Further, each user has a top level

Photo experience organizing their Photos into a set of Photo Albums (e.g. Jane’s Photos), and a set of Photo Albums.

Service Oriented Architecture

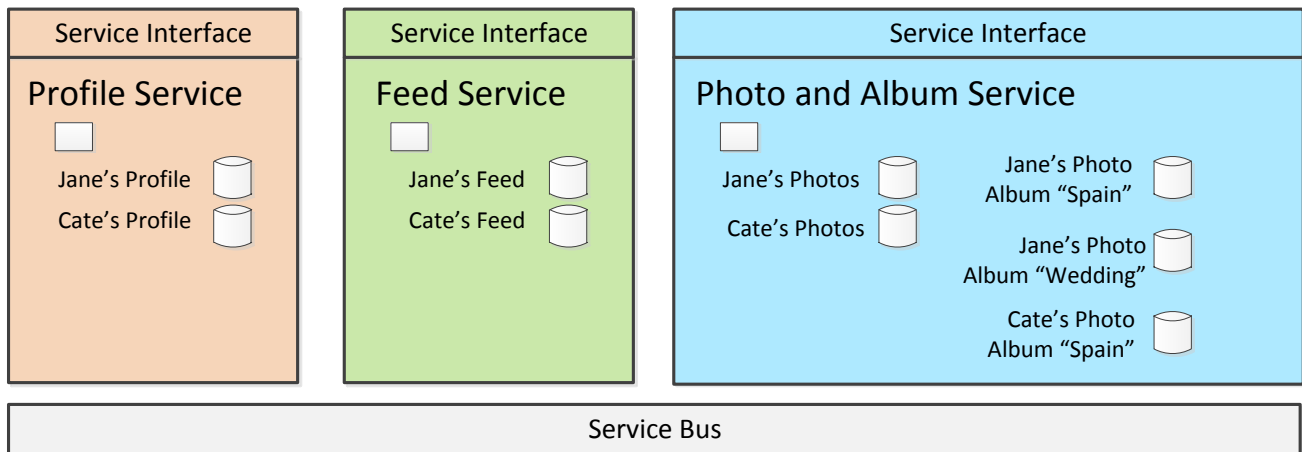


Figure 12 - Service Oriented Architecture for Facebook Example

The above is a completely standard style of architecture used by enterprises today. But it is not how Facebook (or other winning marketplace companies like Netflix, Zynga, etc.) have organized the part of their app dedicated to managing customer relationships.

Why? It is useful to consider some of the problems which a company seeking to execute a Context Driven Strategy would face, if they chose to use Service Oriented Architecture for the customer-facing core of their app.

First, as seen above, Service Oriented Architecture organizes computation by function, not by customers and their value propositions. The representation of a customer (say Jane above) is spread across many different service implementations. The representation of the customer is not integrated in a unified model. This violates the concept of organizing around one-to-one relationships discussed in Section 5.1.

As a result, there is no standard way to discover or interact with information about a customer relevant to a purpose which spans services. For example, to answer the questions “what are Jane’s friends’ favorite photos?” or “what pages did Jane’s friends like on nytimes.com?” multiple services would need to be queried each in their own way, and intermediate results managed by the questioner.

Second, aggregation, analysis, and interpretation are hindered. While predefined analysis within services is effective, aggregation, analysis and interpretation which spans services is made more complex. The lack of a standard model for discovering and interacting with information is one problem. Another is that queries which span services are difficult to express and inefficient to execute. This is even more of an issue when the queries involve following relationships in an iterative manner. Also,

there is no natural place to put the results of an analysis which were not already planned for in some existing service. This interferes with the cycle of learning which is necessary for developing the best contextual insight.

Third, there is no standard way to represent semantic relationships across services. This violates the concept of leveraging relationships between customers discussed in Section 5.3.

Fourth, management and scaling complexity increases with the number of services, as each service is managed and scaled separately. Deployment is at the level of a service rather than a set of customers. This makes it more difficult to roll out new versions of interrelated services to sets of customers, as would be desired to carry out A/B testing or as part of a managed upgrade. Managing policy across the app becomes complex because its specification and implementation span services each with its own organization and mechanisms.

Fifth, evolution of the app is made complex because of the rigidity of service boundaries. Service Oriented Architecture depends on careful advance planning. In Service Oriented Architecture, interaction within a service is more efficient than interaction across services. So given that the boundaries are hard to change, it is important to get the boundaries of services correct in advance. But for many apps, the ways in which they are used or need to be analyzed is different for different sets of customers, emerges over time, and continues to change.

For all these reasons, the apps of marketplace leaders pursuing Context Driven Strategy do not use Service Oriented Architecture to represent customer relationships.²⁸ This is also why many companies whose customer relationships are distributed across siloed services organized in a Service Oriented Architecture have such difficulty in executing a Context Driven Strategy with their current systems.²⁹

5.4.4 An alternative best practice: Composition and Connection

What approach do the marketplace winners use? The clue is given in what was presented in Section 3, namely, that winning in the marketplace requires winning a network of content organized around customers and their value propositions. The alternative best practice takes this understanding as a starting point. The approach to meeting the complexity and scaling challenges of ever-deepening customer relationships is to directly model the network of content that must be won using a graph-oriented conceptual organization.³⁰ This paper uses the term “Composition and Connection” to identify this concept. Composition and Connection may be seen as an evolution of earlier object-oriented approaches like the Business Objects architectural pattern, which preceded the development of Service Oriented Architecture.³¹

²⁸ Service Oriented Architecture is, of course, useful for many other purposes.

²⁹ For example, a retailer could have separate and siloed services for point of sale, e-commerce, its loyalty program, its customer service program, etc.)

³⁰ Note that the model is graph-oriented but the underlying technology need not be.

³¹ Thanks to Phil Bernstein for pointing out this connection.

The first part of the concept of Composition and Connection is to decompose the model of the customer relationship into simpler, combinable services. (This is like Service Oriented Architecture.) For example, the top level Facebook experience can be described as composed of

- a Profile service, managing user profiles and sets of friends;
- a Feed service, managing the news feed for each user;
- a Photos service, managing the top level Photo experience for each user, including a list of their photo albums;
- a Photo Album service, managing individual photo albums;

and so on.

The second part of the concept is to distribute the computation for each service across a set of interconnected typed resources. See Figure 13. Each resource encapsulates some part of the data and computation for the service. How many resources there are per service depends upon the implementation of the service. In our example, there is one Profile resource per person, one Feed resource per person, one Photos resource per person, and one Photo Album resource per photo album. This paper refers to the individual resources as Service Instances.

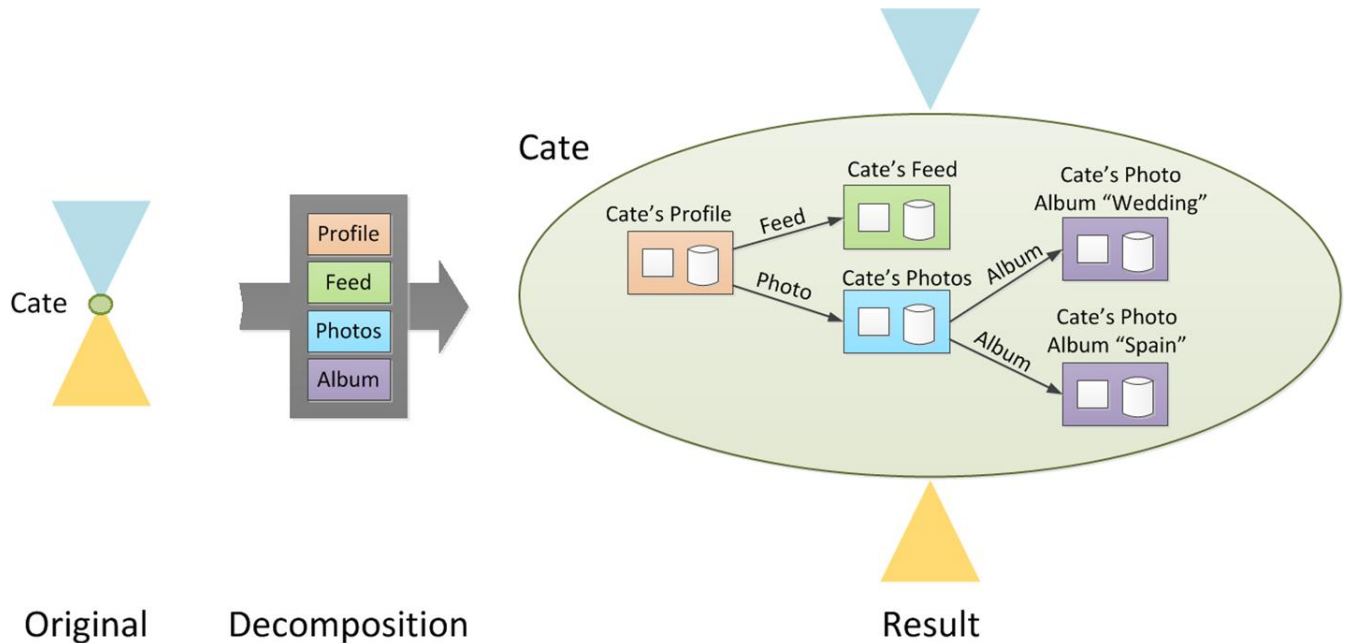


Figure 13 - Composition and Connection

The Service Instances are connected into a graph representing the relationships between them. For example, the graph in Figure 13 shows that “Cate’s Feed” is the Feed for “Cate’s Profile” by the labeled arrow between the two resources. The same figure shows how the original simple relationship (the green circle), when decomposed in terms of the four described services, results in a collection of Service Instances organized into a graph.

The decomposition of customer relationships into connected graphs of Service Instances is naturally extended to the full model of all the company’s customers (as defined in the Customer Layer). See Figure 14. As part of that extension, relationships between customers are modeled as relationships between Service Instances belonging to those customers. As a result, all Service Instances for all customers are unified in a single graph-structured organization. Call this the “customer graph.”

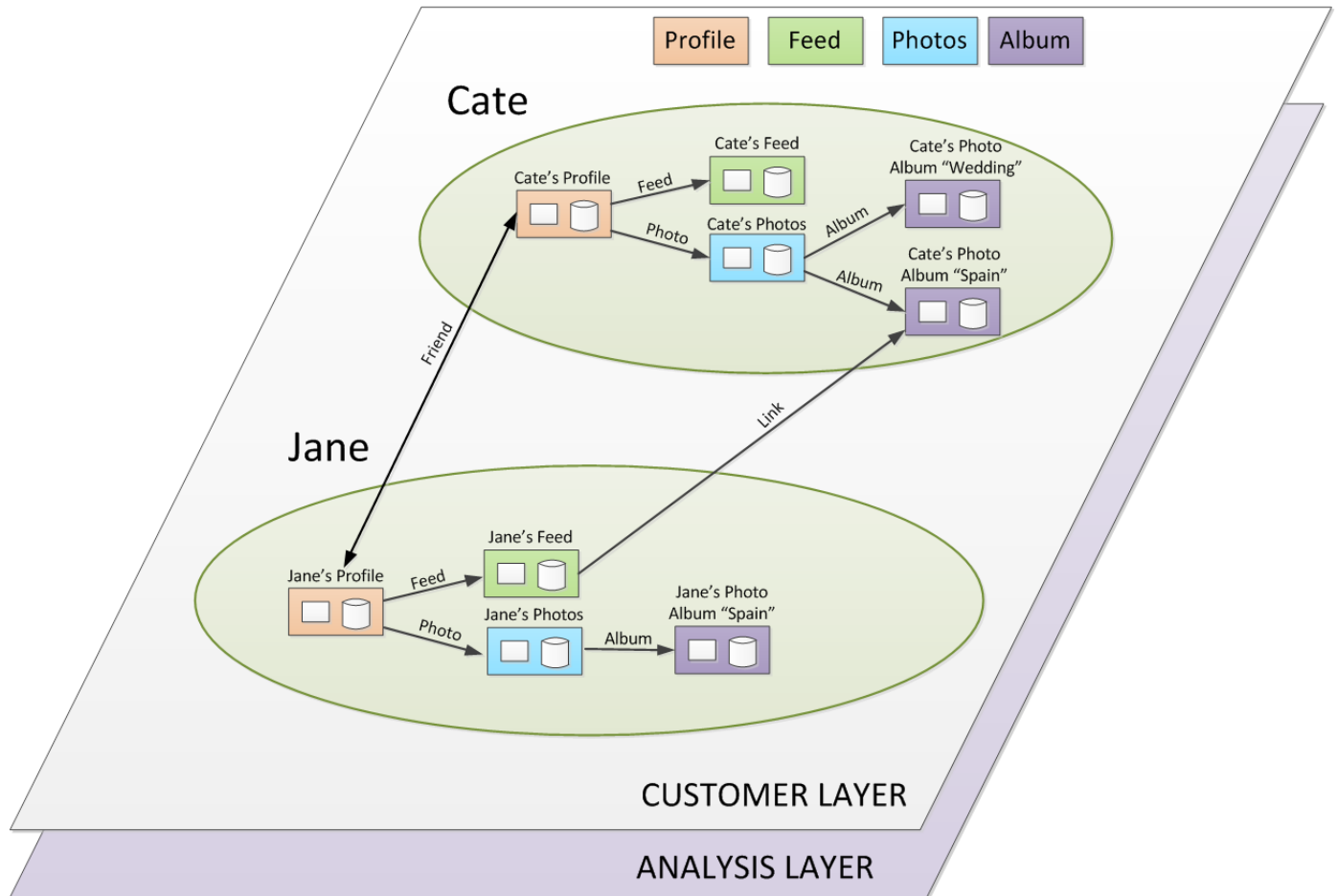


Figure 14 - Composition and Connection in Context

The customer graph in Figure 14 is a more refined version of the picture in Figure 11. Customer graphs of this kind have several important features which are essential to effectively executing Context Driven Strategy. First, consider that Service Instances serve as a kind of proxy for instances of customer value propositions. Second, observe that the company’s representation of each customer is always integrated. Each customer relationship has a clear and well defined representation: a subgraph of Service Instances organizing the data and computation for the customer’s value propositions as they relate to one another. Paths in the customer graph represent semantic concepts important for analysis and action. For example, “the customer’s friends’ favorite photos” or “the customer’s friends’ favorite pages in a named domain.” Third, see that every customer, and every customer value proposition, is represented in the context of all other customers and all other value propositions. The customer graph realizes an

always integrated representation of the company's network of content organized around customers and their value propositions. The company's customer graph directly represents the network of content which the company must win as expressed in Section 3.³² Having such a direct representation makes computation in pursuit of contextual insight more efficient.

The approach of Composition and Connection has powerful implications for the processes of aggregation, analysis and interpretation discussed in Section 5.2. Aggregation can start with any customer or any customer value proposition as represented by a Service Instance in the customer graph and follow semantic relationships in any direction as needed for the analysis. The graph model provides elegant and standard ways to express relationships of interest. Analyses are not blocked or slowed by service boundaries. Interpretation can flexibly extend the customer graph in that the results of interpretation are expressed as changes to the graph. That is to say, the form of the results of interpretation is the same as the form of the content which is aggregated and analyzed. In summary, the customer graph naturally enables analyses of many kinds in all directions, without the need for centralized advance planning, and with the ability to add the results back into the graph for later consumption by future computation. In this way, Composition and Connection supports the kind of evolutionary learning essential to developing the best contextual insight, which is the core of Context Driven Strategy.

The approach of Composition and Connection meets the complexity and scalability challenges of continually extending and deepening company-customer relationships. The approach manages complexity from the company perspective by distributing functionality across services, establishing clean interfaces and boundaries of control. The ability to develop and evolve services in parallel is improved. The customer graph further helps manage complexity by providing a standardized mechanism of cross service integration. Standard resource-oriented mechanisms can be used to navigate the customer graph and interact with individual Service Instances. Testing and deployment become simpler, as version control is possible at the level of the Service Instance. Complexity is managed from the customer perspective, as the model of each customer contains only the Service Instances they use.

The computation required by the system as a whole can be scaled since it is distributed into relatively small elements which can be managed on a distributed scale-out framework.³³ The result is the ability to scale the app on many dimensions, including:

- Number of customers. Facebook has used Composition and Connection to scale to 700 million customers.

³² From Section 3: "Winning in the marketplace requires winning a network of content organized around customers and their value propositions."

³³ The division of a distributed architecture into Scale Aware and Scale Agnostic layers, with the Scale Aware layer providing a Scale Agnostic programming model are discussed in an influential paper by Pat Helland. See Pat Helland, "[Life Beyond Distributed Transactions, An Apostate's Opinion](#)," In Proc. Conference on Innovative Data Systems Research (CIDR), 2007.

- Number of services. New services can be added independently, either by the company or by external partners.
- Usage per customer. Composition and Connection distributes user computation across Service Instances. Different customers can use different Services in different combinations, all on one platform.
- Aggregation, analysis and interpretation.

5.5 Concept 5 – Control access to the app

Controlled access to the customer graph is required by Context Driven Strategy. Consider the three pillars in turn.

- **Relationship.** Access to the customer graph is necessary to enable other companies to deliver content and functionality to the customer. For example, consider third-party Facebook applications like Zynga’s Farmville. A Facebook customer can “install” Farmville into their account, and then Zynga can access that customer’s friend list in order to let the customer easily send Farmville “help me buy this tractor” requests to all their friends. This illustrates the other aspect of access, namely, the need for control. In our example, there are two parties who have a requirement for control, namely, Facebook and the customer. Facebook only wants Zynga to be able to see information for the customers who have installed Farmville. And each customer needs to be able to decide whether or not they want Zynga to have access to their own Facebook information, such as their list of friends. Further, Facebook customers need to have control over whether or not they want to receive Zynga messages at all.
- **Monetization.** Monetization was earlier defined as the company’s ability to profit from access to customer relationships. Two primary kinds of access can be described. The first is required for business units internal to the company to be able to market directly to customers through the company-customer relationship. For example, a customer service business unit might want to sell a new warranty program to customers with certain characteristics. The second is required to enable the company to sell to other companies the ability to access their customers through their company-customer relationships. Advertising in Facebook is a good example of this.
- **Extension.** The primary mechanism by which extension is implemented is the creation of applets which can be installed in remote applications. Facebook’s Social Plug-ins are a good example. These applets will need to be able to access the customer relationship remotely. Since the applets are remote, control is required. See Section 5.6 for more details.

Controlled access may be conceptualized as taking place via an Access Layer. Four functions of the Access Layer can be identified.

- **Interaction** refers to the actions which can be executed in the customer graph by external parties (call them “accessing principals”). These accessing principals work through the Access Layer. The customer graph model created by Composition and Connection supports a natural resource-

oriented style of interaction, where semantic operations can be defined contextually in terms of Service Instances, and their positions in the customer graph. The Facebook Graph API is an example.³⁴ In the diagram below (Figure 15) an example of Zynga interacting with a portion of the Facebook customer graph is shown.

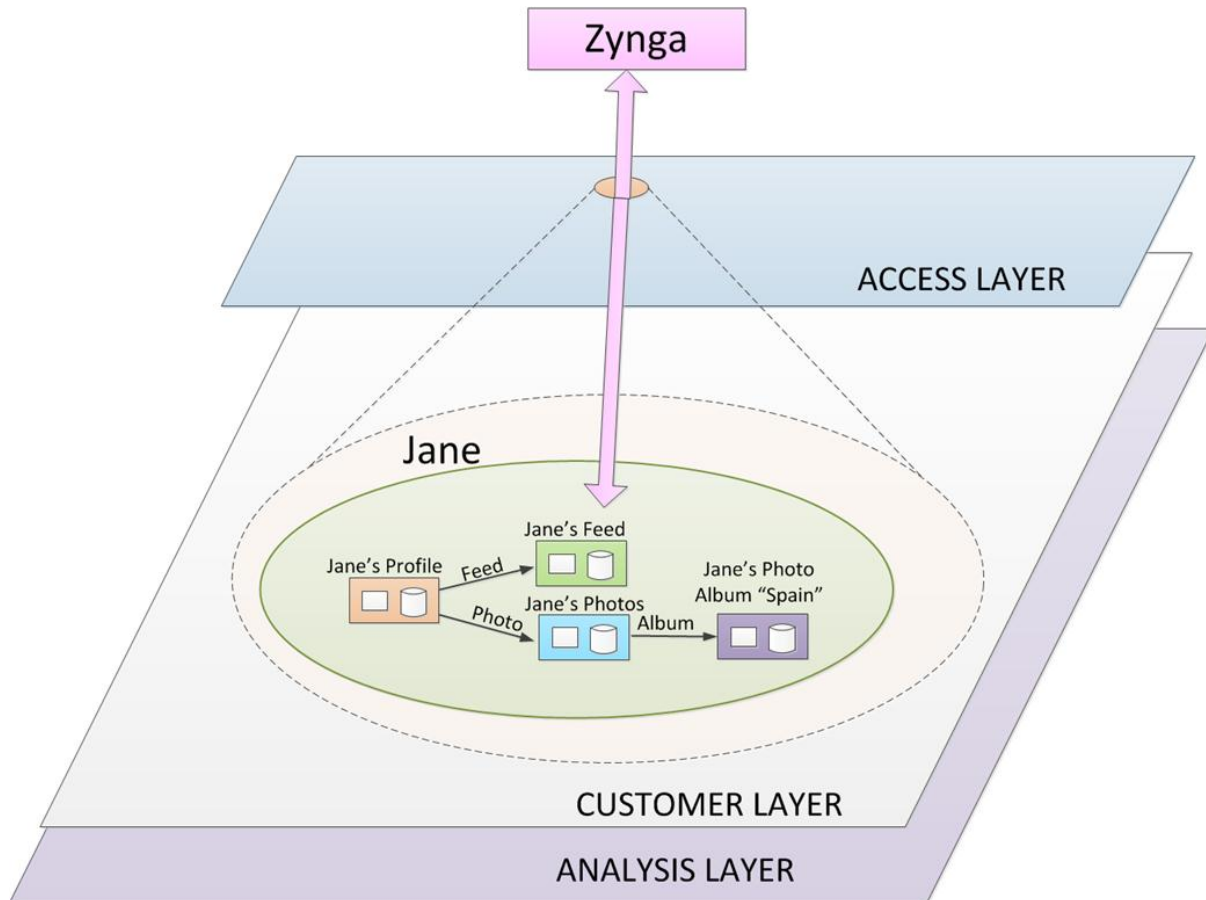


Figure 15 - Controlled Access

- Policy** determines which principals are allowed to carry out what actions through the Access Layer. The Access Layer supports authentication of accessing principals, and authorization of what those principals are allowed to do on the customer graph. There can be multiple layers of policy, for example, from the point of view of the company and the customer. The structure of the customer graph provides a foundation for defining policies. Policies can be assigned to areas of the graph, to types of Service Instances, or even to individual Service Instances. Facebook has a simple policy mechanism by which customers are able to define who has access to their own data. In the diagram below, the area of the graph under Jane's control is highlighted and the fact that Zynga has been granted access to that area through the Access Layer is indicated.

³⁴ Details on the Facebook graph API can be found at <http://developers.facebook.com/docs/reference/api/>

- **Packaging** is a process of taking possible actions which could be carried out in the customer graph and organizing them into “opportunities” by which accessing principals could discover and consume them. For example, “the ability to place an ad in the profile of a female age 25 to 30 who is interested in travel to Spain.” The structure of the customer graph, together with the analytic capabilities described earlier, enable sophisticated and effective packaging of possible actions into monetizable opportunities.
- **Distribution** refers to those mechanisms for optimizing the value the company can extract from the limited resource of packaged opportunities available for interaction. One example, would be an Ad Marketplace. Another example, would be a mechanism by which business units within the company could compete for opportunities to interact with the customer. The structure of the customer graph, and the analytic capabilities described, enable optimization of distribution.

5.6 Concept 6 – Use remote applets to extend the app to other apps

Extension is defined as the company’s ability to extend its relationship with the customer into the context of relationships the customer has with other companies. As mentioned in the last section, applets are a typical mechanism for implementing this capability. For example, Facebook has an “Activity Feed” Social Plug-in. This applet shows the activity of the customer’s friends on a specified domain.

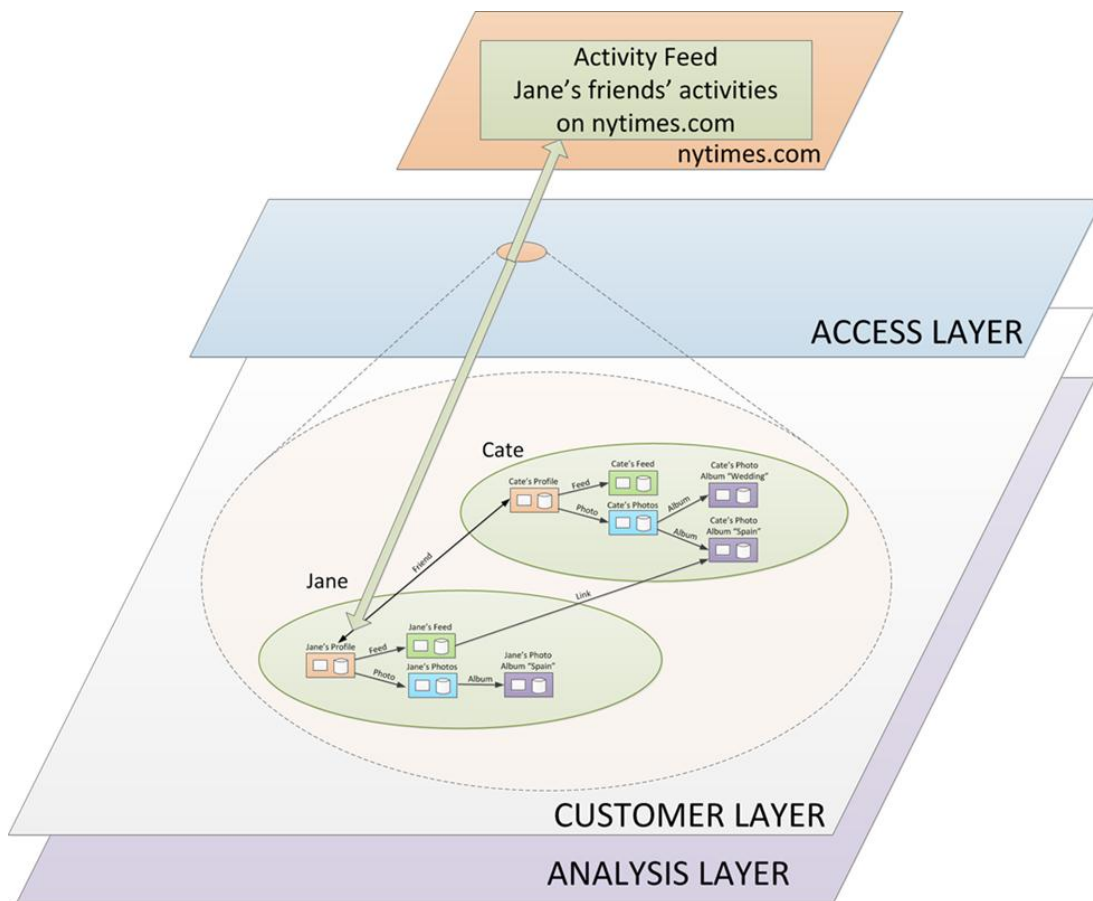


Figure 16 - Remote Applets

In order to be able to implement such an applet, there needs to be access to the Customer Layer as discussed in the previous section. In Figure 16, an example of an Activity Feed applet accessing customer graph information through the Access Layer is presented. The access is from Jane's point of view.

The functionality of applets are enhanced by the combination of the (1) control of the Access Layer, (2) the structure, navigability, and interaction possibilities of the Customer Layer, and (3) the use of the Analysis Layer to determine the most valued content based on the context of the customer and their applet.

5.7 Context Oriented Architecture is the Future of the App

The preceding discussion has explored the following concepts of app architecture:

- Organize around one to one relationships;
- Aggregate and analyze content globally, interpret locally;
- Leverage relationships between customers;
- Model relationships using composition and connection;
- Control access to the app;
- Use remote applets to extend the app to other apps.

Together these concepts are collectively designated as Context Oriented Architecture. The discussion has demonstrated how these concepts work together to enable effective execution of Context Driven Strategy. Context Oriented Architecture is a best demonstrated practice for how a company can successfully execute Context Driven Strategy. Since companies should form and execute a Context Driven Strategy for winning in the marketplace, we can expect that companies will want to implement an app using Context Oriented Architecture. **Context Oriented Architecture is the future of the app.**

6. Implications of the Future of the App

6.1 Summary

This paper has shown the following important ideas. The nature of business is changing as the focus of competition shifts from marketplace to marketpace. Companies need to form a marketpace strategy. A marketpace strategy requires winning a network of content organized around customers and their value propositions. For any network of content, the company that has the best contextual insight, that is, the best knowledge of what content is most valuable to whom in what context, wins the network. Context Driven Strategy is the form of a winning marketpace strategy. It shows how to use the pillars of relationship, monetization and extension to develop the best contextual insight. The success of Context Driven Strategy has been demonstrated by many pure marketpace companies, including Google and Facebook. Companies which need to win in the marketpace should form and execute a Context Driven Strategy. The best demonstrated practice for executing Context Driven Strategy is to develop an app using Context Oriented Architecture.

6.2 Action steps

Given the findings of this paper, a company should seek to (1) assess their position relative to the marketplace-to-marketspace transition; (2) develop their marketspace strategy; (3) form a tactical plan for executing that strategy; and (4) identify advisers and resources to help with the transition.

Assessment. First, the company needs to determine its position relative to the marketplace-to-marketspace transition. This transition is continuous and occurs across multiple dimensions of the market(s) in which the company competes. Relevant dimensions³⁵ include:

- **Product.** How are different product segments making the transition? Historical evidence shows that different segments move at different times. Also, some product segments will transition from products to services, and as such become more marketspace oriented. The business models of certain companies may be at risk as a result of some segments moving even if all do not.³⁶
- **Customer.** How are customer segments changing their behavior and expectations? How are customers learning about, deciding between, and buying products and services?
- **Costs.** How is the marketplace-to-marketspace transition affecting costs in the market, and the company's costs relative to its competitors?
- **Competitors.** Are new entrants entering the customer value chain (as the examples of YouTube, Facebook and Apple in the telephone example earlier in this paper)? How are competitors shifting their revenue mix? How does the company compare to its competitors on the dimensions of relationship, monetization and extension?

As a result of this assessment, the company should be able to decide whether or not it needs to begin defining and implementing a marketspace strategy.

Strategy. Assuming action is called for, the company should define its long term marketspace strategy based on the principles of Context Driven Strategy. It should create a vision of what the company and its market position will look like after the transformation to a marketspace orientation has taken place. Looking at the examples provided in this paper, we see that every market has its own marketspace structure organized around the characteristics of its customers and their value propositions. The company needs to define what their marketspace looks like. Further, the concepts of relationship, monetization and extension have different meanings in different markets. The company needs to define these concepts for itself. Once defined, the company needs to identify the relevant contextual insight for each strategic pillar, and how it will be measured.³⁷ The company needs to assess where it stands on

³⁵ Some of these dimensions are discussed in "[Competing in the Marketspace: An Empirical Study](#)" a 1999 INSEAD working paper by Soumitra Dutta, Stephen Kwan, and Arie Segev.

³⁶ For discussion and examples, see "[Retailing Revolution: Category Killers on the Brink](#)" a Harvard Business School working paper by Rajiv Lal and Jose B. Alvarez, published 10/10/2011.

³⁷ For example, in the search network, number of searches is one proxy for relationship, revenue per search is one proxy for monetization, and number of syndicated searches is one proxy for extension. Each network will have its own measures.

those measures relative to its competitors, and to use the measures to set goals. Given the impact of network effects in Context Driven Strategy, the company will want to aim for the best measures in their defined market.

Tactics. With goals in place, the company will need to create a plan for execution. Several important aspects of the process can be identified: the implementation of an app using Context Oriented Architecture; the integration of this app into existing back end systems; and the development of new ways to exchange information with other companies' apps. Consider each of these aspects in turn.

1. Executing Context Driven Strategy with an app using Context Oriented Architecture will require that the app be implemented as a (private or public) cloud service. In a competition to win a network of content the amount of computation is not fixed. It is important to be able to scale the amount of computation to the degree that the value of the additional computation exceeds its cost. This drives the need to scale the architecture in many dimensions. The architecture needs to be scaled to a higher number of customers, a higher number of services, a higher amount of usage by customers, and a higher amount of analysis and interpretation. The nature of Context Oriented Architecture is that the whole architecture needs to be scaled as one. As a result a cloud architecture is required.
2. The integration of the cloud service which implements the company's app with the company's existing back end systems can be expected to use standard application integration techniques such as messaging and workflows. For example, the customer facing cloud service can execute as a participant in the company's Enterprise Service Bus. Context Oriented Architecture supplements Service Oriented Architecture. It does not replace it.
3. Executing Context Driven Strategy with an app using Context Oriented Architecture will lead the company to increase the amount and kinds of information exchanged with other companies. Each of the three pillars of relationship, monetization, and extension depend on information interchange. Determining what information is exchanged and how the exchange happens is critical to the success of Context Driven Strategy.³⁸ Special care must be given to protecting the company's intellectual property and the privacy of its customers.

The process of transformation can and should be staged. Targeted projects should be identified with which to begin the transformation of the company's systems, processes, and organization. Methods of resource allocation, measurement and feedback should be established.

Resources. Transforming a business from a focus on products and/or stores to a focus on customers and their value propositions is complex, and may involve tasks and techniques with which the company can benefit from the experience and expertise of its partners. The company should seek help from its consultants, advisers, and technology suppliers.

³⁸ Facebook's evolving content ecosystem is a very good example to study.

6.3 Conclusion

Customer relationships are moving online. This shift is leading companies to adopt a new kind of business strategy based in contextual interpretation of data. To execute such strategies, companies will adopt a new kind of application architecture. Companies should assess their position relative to these trends, and shape their plans for customer relationship management and information technology architectures accordingly.

7. Glossary

Term	Definition
App	<p>An app is the information system a company uses for delivering value to customers. Successful marketplace companies use their app as the central element in their execution of Context Driven Strategy.</p> <p>From the customer's point of view, the company's app is the instantiation of their relationship with the company. In other words, the app is what the customer sees, it is through the app that the customer interacts with the company, and it is the app that maintains the state of the customer's relationship with the company.</p> <p>From the company's point of view, the implementation of their app instantiates what they know about the network of content that they must win, and is the channel by which they interact with their customers.</p>
Contextual Insight	Relative to a network of content, the knowledge of what content is most valuable to whom in what context.
Context Driven Strategy	<p>A general strategy for winning a network of content organized around customers and their value propositions. There is a single idea at the center of Context Driven Strategy. Winning a network of content requires developing proprietary knowledge about the contents of the network, as well as the intentions, knowledge, and behavior of participants in the network. The fundamental strategic hypothesis is as follows: For any network of content, the company that owns the best knowledge of what content is most valuable to whom in what context, wins the network. Context Driven Strategy is based on the pillars of relationship, monetization and extension.</p>
Context Oriented Architecture	<p>A general pattern in the app architectures of successful marketplace companies. Context Oriented Architecture refers to app architectures which employ the following concepts:</p> <ul style="list-style-type: none"> • Organize around one to one relationships • Aggregate and analyze content globally, interpret locally • Leverage relationships between customers • Model relationships using composition and connection • Control access to the app • Use remote applets to extend the app to other apps

Extension	The company's ability to reach their customers in the context of other companies' relationships. One of the three pillars of Context Driven Strategy.
Marketplace	A market in which transactions take place in physical space.
Marketplace to Marketspace Transition	A transition from transactions taking place in physical space to transactions taking place online, in the context of relationships mediated by information spaces.
Marketspace	A market in which transactions take place online, in the context of relationships mediated by information spaces.
Marketspace Imperative	First version: Companies operating in the marketplace, must develop and execute strategies for winning in the marketspace. Second version: Companies operating in the marketplace, should develop and execute a Context Driven Strategy for winning in the marketspace.
Monetization	The company's ability to profit from access to the customer via the relationship. One of the three pillars of Context Driven Strategy.
N=1	A concept of Prahalad and Krishnan, that value is based on the unique personalized experiences of consumers.
R=G	A concept of Prahalad and Krishnan, that companies must draw on a global (G) network of resources (R) in order to meet the needs of customers one at a time.
Relationship	The company's ability to deliver value to the customer. One of the three pillars of Context Driven Strategy.
Winning in the marketspace	Winning in the marketspace means gaining leading market share and establishing strategic competitive advantage in the whole market in which the company competes: whether online or in the physical world.

8. Marketspace Network Winners

Market Category	Winner	Network	Market Capitalization (in billions of dollars) ³⁹
Search	Google	Network of Web Pages	189
Social Networking	Facebook	Network of People, Shared content, and Apps	100 (est) ⁴⁰
General Online Retail	Amazon	Network of Buyers, Sellers, and Products	86
Paid Video	Netflix	Network of People and Paid Content	4
Auction/Retail	Ebay	Network of Buyers, Sellers and Auctions	37
Free Video	YouTube	Network of People and Free Content	in Google
News Feeds	Twitter	Network of Reader/Publishers, Feeds, and Topics	8 (est) ⁴¹
Music	iTunes/Ping	Network of People, Playlists and Content	in Apple
Video Games	XBox Live	Network of Players, Games, Publishers	in MSFT
Social Games	Zynga	Network of Players and Games	14 (est) ⁴²
Telecommunications	Skype	Network of People, Conversations, Messages	8
Business Networking	LinkedIn	Network of People (resumes) and Groups	6

³⁹ As of 11/29/2011, except for Skype (as of 5/11/2011)

⁴⁰ Shayndi Raice, "[Facebook Targets Huge IPO](#)," *Wall Street Journal*, 11/29/2011.

⁴¹ Dominic Rush, "[Twitter valued at \\$8bn after large investment](#)," *The Guardian*, 8/2/2011.

⁴² Richard Waters and Chris Nuttall and Telis Demos, "[Zynga Targets IPO for December](#)," *ft.com*, 11/29/2011.