Switching Suppliers at Nokia

Case-2014-02-Nokia-Switching-Suppliers

It was a cold November afternoon in 2000 in Boston, MA, U.S.A. John Ellenberger, manager of the engineering team of Nokia's message service organization, was in the middle of a meeting. Jointly with colleagues, he was discussing a serious problem that had occurred during the planning phase of their new product, a multimedia messaging service (MMS). Nokia was planning to produce the first mobile cell phones in the world capable of sending multimedia messages. While Ellenberger had been very excited about the project in the beginning, the current situation had him worried and cast doubts on the whole project.

1 Introduction

Nokia, the leader in the mobile phone market, wanted to extend its lead. Its strategy included a new service that would make it possible for everyone to share media with friends and families, even if they had no access to new and expensive multimedia phones. To make this possible Nokia was developing a series of services that allowed new Nokia mobile phone owners to post media in web-based albums, exchange multimedia messages via email, and send and receive voice messages. All these functions were to be performed via a message store, the heart of the service. A message store is basically a database that is able to store, retrieve and manage various multimedia content.

The first release of the service has already been a great success for Nokia and they were now working on improvements and new features for the next version.

A key issue emerged during planning. The product team had become concerned about the viability of the message store, a core component of the product. This component had been licensed from a separate software company, which now was in financial troubles and could possibly go out of business. Even though the Nokia product team had access to the source code, it would be difficult for the team to maintain a large and unknown code base. Also, the Nokia team worried about the scalability and performance of the message store's current architecture: It might not be able to handle the expected increase in traffic on the servers.

2 History of Nokia

Nokia had been founded in Finland in 1865 by an engineer named Fredrik Idestam as a paper manufacturer. The name originates from a town in Finland, where the paper factories were located. In 1967 the company merged with Finnish Rubber Works and Finnish Cable Works to form Nokia Corporation.

During the 1970s, Nokia became involved in the telecommunications industry. It introduced its first car phone, the Mobira Senator, in 1982. In 1987, Nokia launched one of the world's first mobile phones, the Mobira Cityman 900. With a weight of only 760g, when compared to other devices of its time, the Cityman was very lightweight. Despite its high price, demand for the Cityman was high. Quickly, Nokia managed to acquire a considerable share of the market.

After temporary financial problems in the late 1980s, Nokia made a strategic decision to focus exclusively on telecommunications in 1992. Nokia was one of the key players in the development of the "Global System for Mobile communications" (GSM)[1] standard, which brought high-quality voice calls, international roaming and support for text messages (Short Message Service) to users. Nokia launched their first digital GSM phone, the Nokia 1011, in 1992.

By 1997, Nokia was supplying its mobile phones to over 30 countries, more than any other manufacturer (Steinbock, 2000). In 1997, Nokia was one of the founding companies of the Wireless Application Protocol (WAP)[2], a new global standard for Internet-based mobile phones. By the end of 1998, Nokia became the world leader in mobile phones (see Figure 1). Between 1996 and 2001, Nokia increased its revenue from EUR 6.5 billion to EUR 31 billion.

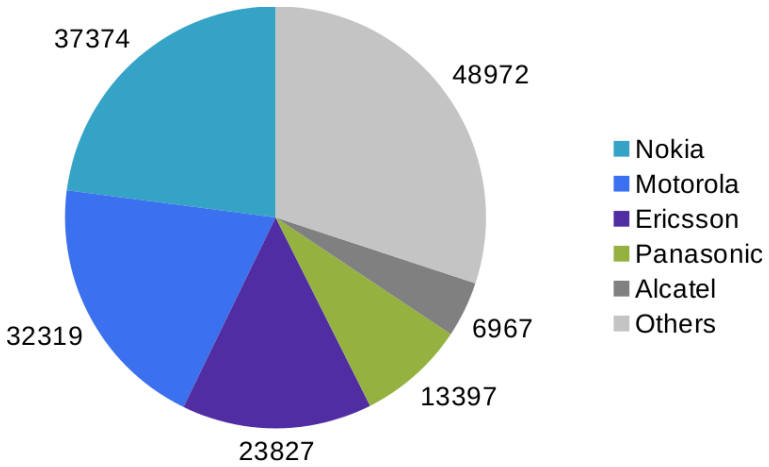

Figure 1: Estimates of worldwide mobile phone sales for 1998 (in thousands of units) (Tech-Insider (based on GartnerGroup's Dataquest '99), 1999)

Over the past 140 years, Nokia had evolved from a Finnish paper manufacturer to a global telecommunications leader that connected over 1.3 billion people. With the arrival of the new

1 Standard developed by the European Telecommunications Standards Institute to describe protocols for second generation (2G) digital cellular networks used by mobile phones.

2 A technical standard for accessing information over a mobile wireless network.

Millennium, it became obvious that mobile phones were no longer just to be used for phone calls. Challenges and opportunities were coming up strong.

3 Product Background

3.1 Multimedia Messaging Service

At the end of 90s, mobile phones had become widespread all over the world and texting, a.k.a. Short Message Service (SMS), had become very popular. SMS services formed a highly competitive market. In order to stay ahead of its competitors, Nokia decided to take a major leap forward.

The Internet had started to become broadly available and it was certainly going to be mobile. Email penetration and the popularity of sending pictures via email showed that there was a huge potential for multimedia messaging. Considering these factors, Ellenberger and his team had a breakthrough idea: To combine the traditional messaging service with multimedia messaging. This could be the next big thing in telecommunications.

Nokia had become the trend-setter in the personal messaging market. Nokia's MMS involved a complete end-to-end solution for mobile messaging (Lillie, 2012), and allowed people to share versatile content including images, audios, videos, etc. via the cellular network. To send and receive MMS messages, users needed special mobile phones like those sold by Nokia and other vendors.

These phones were comparatively expensive: They cost about $1000, which was 3-4 times as much as a regular mobile phone. Ellenberger and his team knew that not everybody would adopt the new technology at this price point. Therefore, they realized that they needed additional services that allowed people to share files not only phone-to-phone, but also as an email attachment.

3.2 Message Store Technology

Nokia's customers were both end-users, who purchased mobile phones, and telecommunication service providers, who purchased software solutions to operate the mobile network. One such software solution in the context of mobile telephony is the messaging server. This type of software handles the storing and forwarding of SMS and MMS messages.

The message store is one of the most important components of a messaging server, containing the user mailboxes as well as services that provide access to the mailboxes. It typically has a a store-and-forward architecture, which is a common architecture in telecommunications services. It is also much more complex to realize for MMS messages than for SMS messages.

The key component in an MMS network architecture is the Multimedia Messaging Service Center (MMSC). It is based on WAP technology (see Figure 1) and provides addressing, storing and forwarding functions.

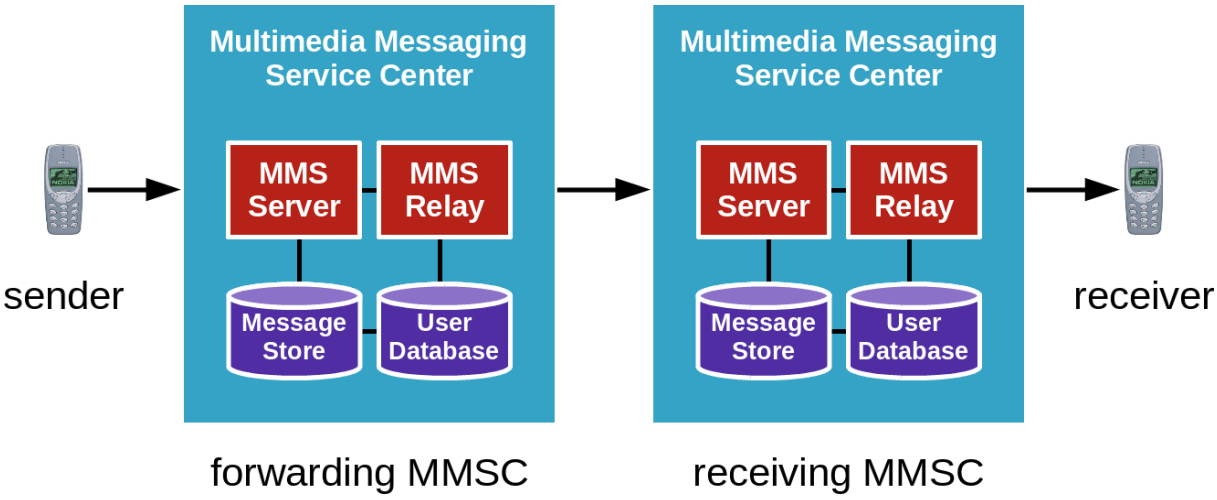

Figure 1: MMS Network Architecture (Ghaderi & Keshav, 2005, p. 2)

When the user sends a multimedia message, it will be forwarded from the sending device to the telecommunication operator's store-and-forward server, the MMSC. The MMSC stores messages until they have been delivered successfully. There are typically two MMSC involved: One for the sender and one for the receiver. The sender's MMSC forwards messages to the receiver's MMSC.

If the recipient phone is capable of handling MMS messages, the recipient will be notified via SMS with a link (URL) to the MMS message content. Thus, the user can retrieve the content using a WAP browser. If the recipient phone is not capable of handling MMS messages, the recipient is notified via SMS and the message is delivered to a web-based service (for example, an email account) where the content can be viewed from a regular Internet browser (Sevanto, 1999; see Figure 2).

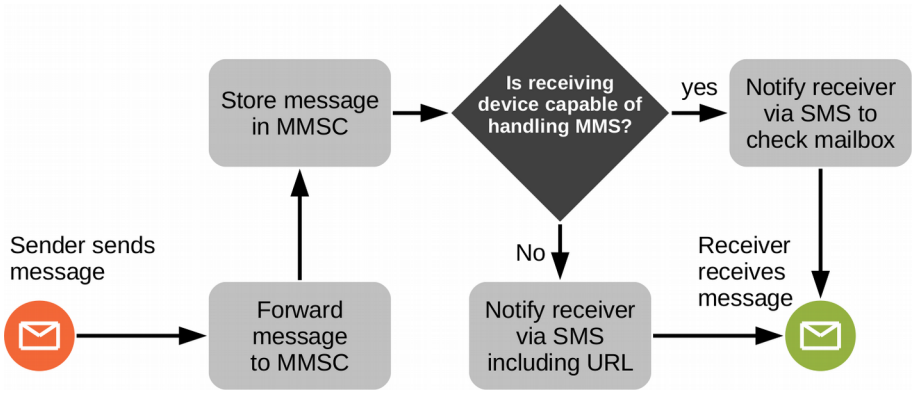

Figure 2: MMS message delivery process

The first version of Nokia MMS services was a great success. It was quickly installed and put into operation in a number of high availability telecommunications environments worldwide.

The first version was designed to use a commercial email (SNMP[3]) IMAP/POP[4] server as a message store. When Nokia moved to design and implement the second version of their highly successful product, a crucial problem occurred during the planning phase. It concerned the vendor of the message store software.

4 Vendor decision

4.1 Initial position

For the original product, Nokia had decided to use an email server for storing and forwarding messages. At that time, the market was strongly dominated by a duopoly consisting of IBM and Microsoft. There were only a few independent vendors offering an email server. One of these companies was Critical Path Inc. Nokia came to an agreement and signed a contract with Critical Path Inc. to license its software for messaging services, security and operations.

Critical Path, Inc. had been founded in 1997. Its main customers were mobile operators, telecommunication companies, ISPs[5] and related enterprises. The company provided messaging and collaboration services. Its customers include more than 700 companies, eight national postal authorities, 35 government agencies and 190 carriers and service providers, including Vodafone, Telecom Italia and O2.

In 1999, upon going public, Critical Path reported revenues of $16.1 million. For the first quarter of 2000, it reported revenue of $24.6 million and during the next quarter revenue increased to $33.5 million (“GAO”, 2002). The company was a preferred provider to some of the most recognized and respected organizations worldwide.

4.2 Problems arising

However, starting with November 2000, Critical Path took a turn for the worse. Its revenues started to decrease. Critical Path announced that, based on a special committee investigation, they were expecting a continued decrease in revenues until the end of the year and they might have to lay off employees.

Consequently, Ellenberger and his team were worried about their vendor. Critical Path was clearly in trouble. If Critical Path were to go bankrupt, Nokia would have to find another vendor, which would bring along many other troublesome issues. Therefore the team had to find a solution so that their schedule would not be affected.

3 Simple Network Management Protocol (SNMP) is an Internet-standard protocol for managing devices on IP networks.

4 Internet Message Access Protocol (IMAP) and Post Office Protocol (POP) are Internet protocols for e-mail retrieval and storage.

5 An Internet service provider (ISP) is an organization that provides services for accessing, using or participating in the Internet.

It was not only a technology problem, but also a business problem. Thus, Ellenberger, the engineering team and further stakeholders from different departments decided to meet in order to discuss their options.

4.3 Looking for alternatives

As a consequence of the situation, Nokia started to look for alternative solutions to staying with Critical Path. There were not many companies that could provide the service that Nokia was looking for. A quick investigation indicated that there were no acceptable comprehensive alternatives, because the market was consolidated around large integrated solutions from IBM or Microsoft.

Working with large companies like IBM or Microsoft was not as easy as it might sound. The products and services that they provided might be of high quality, but were also comparatively expensive. In buyer-supplier relationships, one of the priorities of companies was to get a service with minimal costs. Since any switch of technologies would cause additional licensing fees and engineering, the cost of goods of the product would also increase. This made the alternative solutions unaffordable for Nokia.

Ellenberger had a plan B in his mind. A plan that would definitively not be easy to pursue, but might solve the problems encountered with Critical Path: Switching to Oracle.

At the time, Oracle was the market leader in the database market and was working on a product that could accommodate multimedia services. It was an attractive solution, because Nokia needed to store messages for a longer period of time than it currently did and Oracle could provide this service. Nokia was already dealing with Oracle as a database vendor and paying for licenses, so this could be a good alternative that would not increase the cost of goods by too much.

From prior experiences, Ellenberger knew that Oracle had a well-working support and service unit, which would also benefit the supplier situation. With Oracle being a big and stable company, Ellenberger knew that he would not have to consider another supplier switch due to financial instability any time soon, because Oracle was in a much stronger and diversified position than Critical Path.

Ellenberger and his team structured the ideas, the possible options and the risks, and then narrowed them down into two main topics. The first topic was long-term viability of the software vendor and associated costs, and the second topic was technology and a superior solution. With this structure, they started the meeting.

4.4 Business Risks

Everybody in the meeting room was nervous, but at the same time motivated and dedicated to find out the best solution. Discussion was lively and everyone contributed to find a solution. The decision making process was not easy. Everyone knew that Critical Path was in trouble and that the current solution had technical limitations. There were different dimensions to consider and each had their own risks. Thus, all the dimensions had to be analyzed carefully and in detail.

4.4.1 Staying with Critical Path

The business risks of staying with Critical Path were significant. The company was in trouble and nobody could foresee the final outcome.

Furthermore, Ellenberger's engineering team was insisting on a message store solution with improved functionality to be developed and released as soon as possible. It would not make sense to launch a product on time without any improved functionality, as this had been the main objective of this project in the first place. One of the engineers emphasized this point:

> "What if we choose a vendor only because it is a cheaper solution and we won't be able to achieve our objectives for the second version properly? You must consider the technical capabilities of the message store too! Except this time, time-to-market is key and we have to release as soon as possible!"

The room fell silent. Everyone knew that he had a point. Worries and uncertainties were written all over everyone's faces. This was not going to be easy. Internal calculations showed that the lack of functionality would most certainly result in a situation where Nokia could only address 50% of the available market, while with the originally aimed-for extended functionality, 80% would be possible.

It was a huge engineering challenge. Suddenly, the bigger risk appeared to be not the vendor, but whether the engineering team would be able to release the service successfully. In a telecommunications business environment, engineers were usually under substantial time pressure and any switch was going to make it even more difficult to get the work done. If they were going to replace the technology, all the existing customer data had to be transitioned, which was a long and painful process.

The engineering team had been working on this product even before the matching phones became available. Thus, they had existing customers that had to be supported in a database migration, but more importantly they had to consider the future impact of this transition on their customers. If Nokia failed to satisfy its customers, it might be in significant troubles itself.

4.4.2 Switching to Oracle

Oracle is one of the largest software companies on the planet and popular worldwide. However, their products and services were of high price. At the meeting, one of the product managers expressed his concerns about the cost factor and the possible schedule delay:

> "The switching costs are important. If we switch to Oracle, we should not forget that it is not a cheap solution. We have to make sure that, in the end, it would not affect our cost of goods too much. In addition, we should not forget that we are in a competitive market and we have to consider how to get the release out in time. The clock is ticking. We have a planned schedule and it won't be good to delay product release, if we want to stay the market leader."

The costs of switching suppliers would require additional engineering work: Four technical full-time equivalents (FTE)[6] for software development and three technical FTE for database

6 One technical FTE costs about $150,000 p.a. and one marketing and sales FTE costs about $250,000 p.a. including all commission.

migration would be needed for about six months each. This would increase the technical staff by approximately 20% for the time of the migration from Critical Path to Oracle.

The number of marketing and sales staff needed mostly depended on market growth rate and relative addressable market. However, a switch to Oracle would require retraining of the marketing staff. The costs for retraining the existing sales and marketing staff of 10 FTE in the first year would account for up to 5% of the total switching costs (development, migration and retraining). While in training and still learning, the existing staff would not be productive and would have to be compensated for.

If Nokia decided to switch the vendor, they would also have to take the risk that the product release might get delayed. The planned schedule was important because the market was evolving rapidly and the mobile market customers were very demanding. If Nokia wanted to become the market leader, they had to find a solution which allowed them to release the product on time.

Furthermore, with Oracle being one of the biggest vendors of database software and services, vendor lock-in would increase.

The meeting proceeded. Suddenly, one of the engineers asked permission to speak:

> "We have to consider which database vendor is preferred by which telecommunications company. For example, European operators mostly prefer to work with IBM databases. If we choose a vendor which is not popular with them, it might hurt our sales. I believe that this is also a big concern for us."

Ellenberger agreed to this. He feared a negative response to choosing Oracle over other companies like IBM, which were preferred in Europe.

4.4.3 Revenues and Costs

In addition to the switching costs, Ellenberger, his team, and the product managers also had to consider revenues and costs in a market expected to grow in leaps and bounds. Exhibit 1 shows this growth.

The year 2002 was the first year for which production use of the new MMSC was expected, including possible competitors' solutions. Exhibit 2 provides a growth projection of the number of MMS messages to be sent starting that year. Nokia's prediction was that they would be able to acquire 20% of that market in the first year and grow their share by 5% p.a. thereafter.

A product manager also predicted that a delay of one year would cause a reduced market share in the first year of sales: Sales would be lower by 3%, if Nokia switched to Oracle, or 5%, if Nokia stayed with Critical Path.

Nokia expected the MMS fee charged by telecommunications providers to be $0.50 per MMS in the first year, depreciated by $0.10 every following year until the price per MMS reached $0.20. The development team was certain that Nokia would be able to receive a 10% share from the MMS income generated by these providers.

Some of this revenue would have to be passed on to the database vendor. While Critical Path only charged $0.005 per MMS for the database usage, Oracle charged $0.01 per MMS.

4.5 Technical Risks

4.5.1 Staying with Critical Path

If Critical Path were to go out of business, they obviously would not be able to deliver services to Nokia anymore. Thus, over time, the MMSC's performance would degrade, resulting in unsatisfied customers and a delayed time to market of new functionality. A manager from the marketing team was raging:

> "We cannot risk to loose our first MMS customers only because this small vendor goes out of business and our product cannot be delivered in time! We should have chosen a financially stable vendor from the beginning, so we wouldn't have to sit here and discuss for hours on end!"

Naturally, Nokia had taken precautions in the software contract with Critical Path, which allowed them to access the source code if the vendor went out of business. Still, in reality, it was not that easy: Even though Nokia had the right to work with and change the source code, it was nearly impossible to maintain an unknown code base and to keep the service running for a longer time.

Another important issue was the busy servers. As the traffic on the deployed servers began to increase, the team worried about scalability and the performance of the existing architecture. This was exacerbated by the fact that the product was licensed by message throughput and not by message size. Apparently the servers were no longer sufficient for storing and forwarding the increased MMS data volume and they had to be exchanged.

Standard database providers were just beginning to ship products that were capable of dealing with the storage and retrieval of multimedia. Among these providers, there were few examples of successful deployments to make the engineering team comfortable with the potential risks of a new message store. Nevertheless, customers in the telecommunications carrier market require highly scalable and reliable systems. Therefore, they already had their own commercial database providers that could meet any product's growing scalability and reliability requirements. Since the database vendors were already familiar with both the technology and the business terms of their existing relationships with the operators, this situation could make things easier and the team could take the advantage of it.

4.5.2 Switching to Oracle

By switching to Oracle, the engineering team might have to work with a new and unfamiliar technology which could add risk and delay the development of the product. In a telecommunications environment, such transitions typically had to be undertaken in a short period of time to ensure that the service is not interrupted. The lead engineer of the maintenance team was shaking his head:

> "How should we possibly manage this transition? You all know how our system changes and maintenance works, don't you? We always do it Sunday night from 11pm to midnight to ensure only short down-times! But how on earth could we possibly manage a complete system transition in such a short time? The service would be down for days, if not weeks!"

All data would have to be transferred without loss. Also, ideally, no customer would even notice the transition–but if this could be achieved was highly uncertain.

4.6 Final results

After the long discussions, nobody was sure what to do about Critical Path and how to proceed. The meeting ended with a decision to carry out a field study to be able to make the right decision about the vendor. A field study was required to be able to see the possible alternatives, so that they could make the decision according to the risks, costs and the amount of work they identified that they would need to deal with during a transition.

5 Conclusion

After the meeting, Ellenberger was sitting alone in his office. He could not stop himself thinking about the meeting. He was curious about what the field studies would reveal. Then, the final decision was up the business owner, Ellenberger's boss. However, Ellenberger was still worried about this situation. Lots of possibilities were crossing his mind and he knew that this was going to be a painful process. The clock was ticking. The market was evolving rapidly and the customers were demanding. A decision had to be made.

List of Abbreviations

FTE	Full time equivalent
GSM	Global System for Mobile Communications
IMAP	Internet Message Access Protocol
ISP	Internet Service Provider
MMS	Multimedia Messaging Service
MMSC	Multimedia Messaging Service Center
POP	Post Office Protocol
SMS	Short Message Service
SNMP	Simple Network Management Protocol
WAP	Wireless Application Protocol

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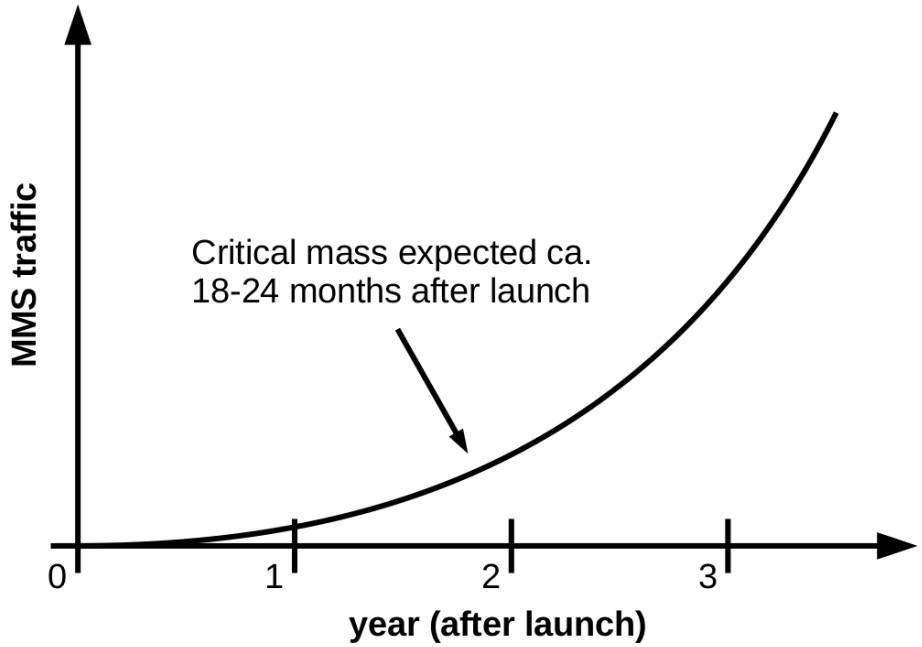
Appendix

Exhibit 1



Projected MMS growth pattern and device take-up (Ralph and Graham, 2004)

Exhibit 2

	2002	2003	2004	2005	2006	2007
SMS	231,517	484,298	775,260	966,151	984,834	886,877
Messaging (P2P)	205,494	425,581	668,214	798,348	792,114	687,423
Content deliver (M2P)	25,651	56,352	102,747	161,891	184,715	190,452
Requests and notifications (P2M)	372	2,365	4,299	5,912	8,005	9,002
EMS	2,451	18,779	66,237	122,957	169,458	170,996
Messaging (P2P)	2,122	16,636	58,776	105,848	142,367	139,410
Content delivery (M2P)	329	2,143	7461	17,109	27,091	31,586
MMS	8,637	27,187	70,833	182,811	354,900	581,190
Messaging (P2P)	8,009	21,713	49,768	123,251	236,752	397,770
Content delivery (M2P)	626	5,238	20,133	56,455	111,884	173,054
Requests and notifications (P2M)	2	236	932	3,105	6,264	10,366

MS Traffic forecasts (Delaney et al., 2002) in millions of messages worldwide

About this Case

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