The demo was not going well.
Again.

It was a late morning in the fall of 2006. Almost a year earlier, Steve Jobs had tasked about 2,00 of Apple's top engineers with creating the iPhone. Yet here, in Apple's boardroom, it was clear that the prototype was still a disaster. It wasn't just buggy, it flat-out didn't work. The phone dropped calls constantly, the battery stopped charging before it was full, data and applications routinely became corrupted and unusable. The list of problems seemed endless. At the end of the demo, Jobs fixed the dozen or so people in the room with a level stare and said, "We don't have a product yet."

The effect was even more terrifying than one of Jobs' trademark tantrums. When the Apple chief screamed at his staff, it was scary but familiar. This time, his relative calm was unnerving. "It was one of the few times at Apple when I got a chill," says someone who was in the meeting.

The ramifications were serious. The iPhone was to be the centerpiece of Apple's annual Macworld convention, set to take place in just a few months. Since his return to Apple in 1997, Jobs had used the event as a showcase to launch his biggest products, and Apple-watchers were expecting another dramatic announcement. Jobs had already admitted that Leopard—the new version of Apple's operating system—would be delayed. If the iPhone wasn't ready in time, Macworld would be a dud, Jobs' critics would pounce, and Apple's stock price could suffer.

And what would AT&T think? After a year and a half of secret meetings, Jobs had finally negotiated terms with the wireless division of the telecom giant (Clngular at the time) to be the iPhone's carrier. In return for five years of exclusivity, roughly 10 percent of iPhone sales in AT&T stores, and a thin slice of Apple's iTunes revenue, AT&T had granted Jobs unprecedented power. He had cajoled AT&T into spending millions of dollars and thousands of man-hours to create a new feature, so-called visual voicemail, and to reinvent the time-consuming in-store sign-up process. He'd also wrangled a unique revenue-sharing arrangement, garnering roughly $10 a month from every iPhone customer's AT&T bill. On top of all that, Apple retained complete control over the design, manufacturing, and marketing of the iPhone. Jobs had done the unthinkable: squeezed a good deal

out of one of the largest players in the entrenched wireless industry. Now, the least he could do was meet his deadlines.

For those working on the iPhone, the next three months would be the most stressful of their careers. Screaming matches broke out routinely in the hallways. Engineers, frazzled from all-night coding sessions, quit, only to rejoin days later after catching up on their sleep. A product manager slammed the door to her office so hard that the handle bent and locked her in; it took colleagues more than an hour and some well-placed whacks with e.n aluminum bat to free her.

But by the end of the push, just weeks before Macworld. Jobs had a prototype to show to the suits at AT&T. In mid-December 2006, he met wireless boss Stan Sigman at a suite in the Four Seasons hotel in Las Vegas. He showed off the iPhone's brilliant screen, its powerful Web browser, its engaging user interface. Sigman, a taciturn Texan steeped in the conservative engineering traditions that permeate America's big phone companies, was uncharacteristically effusive, calling the iPhone "the best device I have ever seen." (Details of this and other key moments in the making of the iPhone were provided by people with knowledge of the events. Apple and AT&T would not discuss these meetings or the specific terms of the relationship.)

Six months later, on June 29, 2007, the iPhone went on sale. At press time, analysts were speculating that customers would snap up about 3 million units by the end of 2007, making it the fastest-selling smartphone of all time. It is also arguably Apple's most profitable device. The company nets an estimated $80 for every $399 iPhone it sells, and that's not counting the $240 it makes from every two-year AT&T contract an iPhone customer signs. Meanwhile, about 40 percent of iPhone buyers are new to AT&T's rolls, and the iPhone has tripled the carrier's volume of data traffic in cities like New York and San Francisco.

But as important as the iPhone has been to the fortunes of Apple and AT&T, its real impact is on the structure of the $11 billion-a-year US mobile phone industry. For decades, wireless carriers have treated manufacturers like serfs, using access to their networks as leverage to dictate what phones will get made, how much they will cost, and what features will be available on them. Handsets were viewed largely as cheap, disposable lures, massively subsidized to snare subscribers and lock them into using the carriers' proprietary services. But the iPhone upsets that balance of power. Carriers are learning that the right phone—even a pricey one—can win customers and bring in revenue. Now, in the pursuit of an Apple-like contract, every manufacturer is racing to create a phone that consumers will love, instead of one that the carriers approve of. "The iPhone is *already* changing the way carriers and manufacturers behave," says Michael Olson, a securities analyst at Piper Jaffray.

> **JOBS CALLED THE CARRIERS "ORIFICES." HE WASN'T GOING TO LET THE SUITS TELL HIM HOW TO DESIGN HIS PHONE.**

IN 2002, SHORTLY AFTER THE FIRST iPod was released, Jobs started thinking about developing a phone. He saw millions of Americans lugging separate phones, Black-Berrys, and—now—MP3 players; naturally, consumers would prefer just one device. He also saw a future in which cell phones and mobile email devices would amass ever more features, eventually challenging the IPod's dominance as a music player. To protect his new product line, Jobs knew he would eventually need to venture into the wireless world.

If the idea was obvious, so were the obstacles. Data networks were sluggish and not ready for a full-blown handheld Internet device. An iPhone would require Apple to create a completely new operating system; the iPod's OS wasn't sophisticated enough to manage complicated networking or graphics, and even a scaled-down version of OS X would be too much for a cell phone chip to handle. Apple would be facing strong competition, too: In 2003, consumers had flocked to the Palm Treo 600, which merged a phone, PDA, and BlackBerry into one slick package. That proved there was demand for a so-called convergence device, but it also raised the bar for Apple's engineers.

Then there were the wireless carriers. Jobs knew they dictated what to build and how to build it, and that they treated the hardware as little more than a vehicle to get users onto their networks. Jobs, a notorious

control freak himself, wasn't about to let a group of suits—whom he would later call "orifices"—tell him how to design his phone.

By 2004 Apple's iPod business had become more important, and more vulnerable, than ever. The iPod accounted for 16 percent of company revenue, but with 3G phones gaining popularity, Wi-Fi phones coming soon, the price of storage plummeting, and rival music stores proliferating, its long-term position as the dominant music device seemed at risk.

So that summer, while he publicly denied he would build an Apple phone, Jobs was working on his entry into the mobile phone industry. In an effort to bypass the carriers, he approached Motorola. It seemed like an easy fix: The handset maker had released the wildly popular RAZR, and Jobs knew Ed Zander,

Motorola's CEO at the time, from Zander's days as an executive at Sun Microsystems. A deal would allow Apple to concentrate on developing the music software, while Motorola and the carrier, Cingular, could hash out the complicated hardware details.

Of course, Jobs' plan assumed that Motorola would produce a successor worthy of the RAZR, but it soon became clear that wasn't going to happen. The three companies dickered over pretty much everything—how songs would get into the phone, how much music could be stored there, even how each company's name would be displayed. And when the first prototypes showed up at the end of 2004, there was another problem: The gadget itself was ugly.

Jobs unveiled the ROKR in September 2005 with his characteristic aplomb, describing'it as "an iPod shuffle on your phone." But Jobs likely knew he had a dud on his hands; consumers, for their part, hated it. The ROKR—which couldn't download music directly and held only 100 songs—quickly came to represent everything that was wrong with the US wireless industry, the spawn of a mess of conflicting interests for whom the consumer was an afterthought. WIRED summarized the disappointment on its November 2005 cover: "YOU CALL *THIS* THE PHONE OF THE FUTURE?"

EVEN AS THE ROKR Went into production, Jobs was realizing he'd have to build his own phone. In February 2005, he got together with Cingular to discuss a Motorola-free partnership. At the top-secret meeting in a midtown Manhattan hotel, Jobs laid out his plans before a handful of Cingular senior execs, including Sigman. (When AT&T acquired Cingular in December 2006, Sigman remained president of wireless.) Jobs delivered a three-part message to Cingular: Apple had the technology to build something truly revolutionary, "light-years ahead of anything else." Apple was prepared to consider an exclusive arrangement to get that deal done. But Apple was also prepared to buy wireless minutes wholesale and become a de facto carrier itself.

Jobs had reason to be confident. Apple's hardware engineers had spent about a year working on touchscreen technology for a tablet PC and had convinced him that they could build a similar interface for a phone. Plus, thanks to the release of the ARM11 chip, cell phone processors were finally fast and efficient enough to power

a device that combined the functionality of a phone, a computer, and an iPod. And wireless minutes had become cheap enough that Apple could resell them to customers; companies like Virgin were already doing so.

Sigrnan and his team were immediately taken with the notion of the iPhone. Cingular's strategy, like that of the other carriers, called for consumers to use their mobile phones more and more for Web access. The voice business was fading; price wars had slashed margins. The iPhone, with its promised ability to download music and video and to surf the Internet at Wi-Fi speeds, could lead to an increase in the number of data customers. And data, not voice, was where profit margins were lush.

What's more, the Cingular team could see that the wireless business model had to change. The carriers had become accustomed to treating their networks as precious resources, and handsets as worthless commodities. This strategy had served them well. By subsidizing the purchase of cheap phones, carriers made it easier for new customers to sign up—and get roped into long-term contracts that ensured a reliable revenue stream. But wireless access was no longer a luxury; it had become a necessity. The greatest challenge facing the carriers wasn't finding brand-new consumers but stealing them from one another. Simply bribing customers with cheap handsets wasn't going to work. Sigman and his team wanted to offer must-have devices that weren't available on any other network. Who better to create one than Jobs?

For Cingular, Apple's ambitions were both tantalizing and nerve-racking. A cozy relationship with the maker of the iPod would bring sex appeal to the company's brand. And some other carrier was sure to sign with Jobs if Cingular turned him down —Jobs made it clear that he would shop his idea to anyone who would listen. But no carrier had ever given *anyone* the flexibility and control that Jobs wanted, and Sigman knew he'd have trouble persuading his fellow executives and board members to approve a deal like the one Jobs proposed.
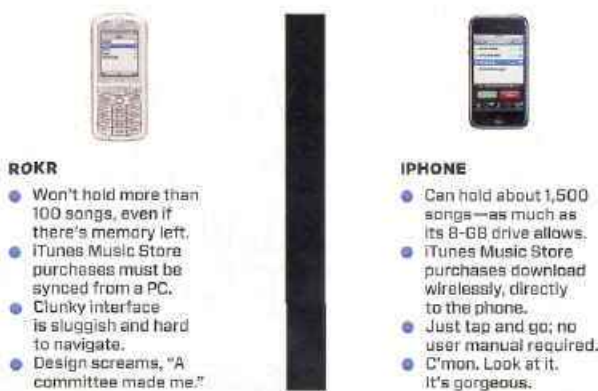
Sigman was right. The negotiations would take more than a year, with Sigman and his team repeatedly wondering if they were ceding too much ground. At one point, Jobs met with some executives from Verizon, who promptly turned him down. It was hard to blame them. For years, carriers had charged customers and suppliers for using and selling services over their proprietary networks. By giving so much control to Jobs, Cingular risked turning its vaunted —and expensive—network into a "dumb pipe," a mere conduit for content rather than the source of that content. Sigman's team made a simple bet: The iPhone would result in a surge of data traffic that would more than make up for any revenue it lost on content deals.

Jobs wouldn't wait for the finer points of the deal to be worked out. Around Thanksgiving of 2005, eight months before a final agreement was signed, he instructed his engineers to work full-speed on the project. And if the negotia-

The Apple Touch

APPLE HAS CREATED TWO MUSIC PHONES. THE ROKR, MADE WITH MOTOROLA IN 2005, RESPECTED THE TRADITIONAL RELATIONSHIPS BETWEEN MANUFACTURERS AND CARRIERS. THE IPHONE, RELEASED LAST SUMMER, COMPLETELY OVERTURNED THEM.

ROKR
- Won't hold more than 100 songs, even if there's memory left.
- iTunes Music Store purchases must be synced from a PC.
- Clunky interface is sluggish and hard to navigate.
- Design screams, "A committee made me."

IPHONE
- Can hold about 1,500 songs—as much as its 8-GB drive allows.
- iTunes Music Store purchases download wirelessly, directly to the phone.
- Just tap and go; no user manual required.
- C'mon. Look at it. It's gorgeous.

> ## SECRECY REIGNED: HARDWARE AND SOFTWARE TEAMS WERE KEPT IN THE DARK ABOUT EACH OTHER'S WORK.

tions with Cingular were hairy, they were simple compared with the engineering and design challenges Apple faced. For starters, there was the question of what operating system to use. Since 2002, when the idea for an Apple phone was first hatched, mobile chips had grown more capable and could theoretically now support some version of the famous Macintosh OS. But it would need to be radically stripped down and rewritten; an iPhone OS should be only a few hundred megabytes, roughly a 10th the size of OS X.

Before they could start designing the iPhone, Jobs and his top executives had to decide how to solve this problem. Engineers looked carefully at Linux, which had already been rewritten for use on mobile phones, but Jobs refused to use someone else's software. They built a prototype of a phone, embedded on an iPod, that used the clickwheel as a dialer, but it could only select and dial numbers—not surf the Net. So, in early 2006, just as Apple engineers were finishing their yearlong effort to revise OS X to work with Intel chips, Apple began the process of rewriting OS X again for the iPhone.

The conversation about which operating system to use was at least one that all of Apple's top executives were familiar with. They were less prepared to discuss the intricacies of the mobile phone world: things like antenna design, radio-frequency radiation, and network simulations. To ensure the iPhone's tiny antenna could do its job effectively, Apple spent millions buying and assembling special robot-equipped testing rooms. To make sure the iPhone didn't generate too much radiation, Apple built models of human heads—complete with goo to simulate brain density—and measured the effects. To predict the iPhone's performance on a network, Apple engineers bought nearly a dozen server-sized radio-frequency simulators for millions of dollars apiece. Even Apple's experience designing screens for iPods didn't help the company design the iPhone screen, as Jobs discovered while toting a prototype in his pocket: To minimize scratching, the touchscreen needed to be made of glass, not hard plastic like on the iPod. One insider estimates that Apple spent roughly $150 million building the iPhone.

Through it all, Jobs maintained the highest level of secrecy. Internally, the project was known as P2, short for Purple 2 (the abandoned iPod phone was called Purple 1). Teams were split up and scattered across Apple's Cupertino, California, campus. Whenever Apple executives traveled to Cingular, they registered as employees of Infineon, the company Apple was using to make the phone's transmitter. Even the iPhone's hardware and software teams were kept apart: Hardware engineers worked on circuitry that was loaded with fake software, while software engineers worked off circuit boards sitting in wooden boxes. By January 2007, when Jobs announced the iPhone at Macworld, only 30 or so of the most senior people on the project had seen it.

THE HOSANNAS GREETING the iPhone were so overwhelming it was easy to ignore its imperfections. The initial price of $599 was too high (it has been lowered to $399). The phone runs on AT&T's poky EDGE network. Users can't perform email searches or record video. The browser won't run programs written in Java or Flash.

But none of that mattered. The iPhone cracked open the carrier-centric structure of the wireless industry and unlocked a host of benefits for consumers, developers, manufacturers—and potentially the carriers themselves. Consumers get an easy-to-use handheld computer. And, as with the advent of the PC, the iPhone is sparking a wave of development that will make it even more powerful. In February, Jobs will release a developer's kit so that anyone can write programs for the device.

Manufacturers, meanwhile, enjoy new bargaining power over the carriers they've done business with for decades. Carriers, who have seen AT&T eat into their customer bases, are scrambling to find a competitive device, and they appear willing to give up some authority to get it. Manufacturers will have more control over what they produce; users—not the usual cabal of complacent juggernauts—will have more influence over what gets built.

Application developers are poised to gain more opportunities as the wireless carriers begin to show signs of abandoning their walled-garden approach to snaring consumers. T-Mobile and Sprint have signed on as partners with Google's Android, an operating system that makes it easy for independent developers to create mobile apps. Verizon, one of the most intransigent carriers, declared in November that it would open up its network for use with any compatible handset. AT&T made a similar announcement days later. Eventually this will result in a completely new wireless experience, in which applications work on any device and over any network. In time, it will give the wireless world some of the flexibility and functionality of the Internet.

It may appear that the carriers' nightmares have been realized, that the iPhone has given all the power to consumers, developers, and manufacturers, while turning wireless networks into dumb pipes. But by fostering more innovation, carriers' networks could get more valuable, not less. Consumers will spend more time on devices, and thus on networks, racking up bigger bills and generating more revenue for everyone. According to Paul Roth, AT&T's president of marketing, the carrier is exploring new products and services —like mobile banking—that take advantage of the iPhone's capabilities. "We're thinking about the market differently," Roth says. In other words, the very development that wireless carriers feared for so long may prove to be exactly what they need. It took Steve Jobs to show them that. 🔲

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