

**Report: Best Practices**

# How the Town of Castle Rock Reduced Its Costs and Improved Mobile Data Performance

Lessons Learned From Mobile Management  
Optimization



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## Purpose and Intent

Castle Rock, Colorado is a town of some 50,000 inhabitants located between Denver and Colorado Springs to the east of the Rocky Mountains. It covers an area of more than 30 square miles.

This case study is the eighth in a series in which user organizations talk about their objectives and experiences when applying mobile technologies, and how those technologies resolve problems or open up opportunities. Through these case studies, Constellation Research clients discover what others had to find out for themselves.

These case studies complement Constellation Research's Mobile Device Management (MoDM), Mobile App and Data Management (MADM) and Mobile Enterprise Management (MEM) reports. In addition, the case studies contribute practical depth to two of Constellation Research's primary research themes:

- Technology Optimization and Innovation
- The New C-Suite and Consumerization of IT

## Executive Summary

Castle Rock is somewhat unusual in that it is a full-service community wherein the town government provides many of the services -- from Police and Fire Departments to various utilities such as water -- rather than contracting out to Special Districts as happens in other communities.

The police are equipped with laptops in patrol cars. Mobile communications from the laptops, primarily provided by cellular wireless services, are used for checking identities and vehicle license plates, and they are also used to send in reports. One of the communications challenges that Castle Rock faced in recent years has been repeated communications service failures, for reasons that were difficult to establish and document.

Kevin Capp has been the Chief Technology Officer (CTO) of Castle Rock for over 10 years. As CTO, Capp is responsible for the provision of the communications and computing necessary for Castle Rock employees to deliver town services.

A key element of technology services provision is mobile communications. Many employees require these to do their jobs. In this case study, Capp discusses how mobile communications problems were investigated and identified, the subsequent and highly revealing negotiations with carriers to resolve them and the practical consequences.

# Knowing What Works and Where It Works

## Kevin Capp, Chief Technology Officer, Castle Rock

"As the Town of Castle Rock CTO, I am responsible for the systems to support the Police and Fire Departments and all the various utilities that the city provides as part of its services to the community. A key aspect of this is that our employees be able to communicate from the field back to the center, and much of this occurs through using mobile cellular capabilities -- both voice and data. This includes support for everything from cell phones to laptops in police cars to devices with water inspectors, and so on. Among the town's other varied responsibilities is approving requests by mobile carriers to install additional cellular masts for improving coverage and/or quality of service.

"With a 50,000 population, Castle Rock is a medium-sized city. We cover an area of a little over 30 square miles, which is big enough and with sufficiently varied terrain that mobile communications do not work everywhere. This causes problems, as I will talk about in the context of our police. In addition, pinning down the exact nature of mobile communications problems has proved difficult -- there was much hearsay but little hard evidence. We face three main issues:

1. **"Officers experience issues with mobile reliability of laptop applications.**

Every week, the department would receive several complaints from officers that applications on laptops were having problems. Most of the complaints failed to provide details. These descriptions were not particularly specific (such as 'it does not work') and could potentially relate to a variety of elements, factors and even interactions (such as car, laptop, applications, communications, servers -- just to name the most obvious). It was, however, up to my group to try to work out what was happening and then solve the issue.

"Laptops in police cars are used for several purposes. The main application enables officers to look up license plate registrations to see if cars are stolen, etc. It can do the same for driver licenses and criminal background histories. The officer enters the data into the application on the laptop, which communicates to police headquarters, where it accesses the necessary servers, whether in Castle Rock or beyond. In addition, officers complete incident reports in the field and send these in electronically from the laptops in the patrol cars; this was introduced so that officers do not have to return to headquarters to file their incident reports. A goal of the Police Department was to keep officers out and more visible in our community.

2. **"Poor mobility coverage is more prevalent than expected.**

In one instance, a man held his girlfriend hostage in a house. Police were on the scene for eight hours before the situation was resolved. Unfortunately, the neighborhood where this occurred turned out to have extremely poor cellular coverage, which caused no end of difficulties. For example, our police chief had to drive away from the hostage scene just to find a location where he could communicate with headquarters, other jurisdictions and even to keep the media up-to-date. As you might imagine, this spurred even more questions about what was happening about mobile communications.

3. **"Identifying the source of failure requires a tool.** Through a process of detailed elimination, the police department realized the issues were not related to equipment but to the cellular communications network. At this point, we contacted our provider to see if it could throw any light on what we were experiencing. The vendor sent us a testing box and told us to leave it running for a few weeks in one of our buildings. After many meetings, their testing box didn't get us any further along in fixing our problem. We then began sending out our own people in police cars, equipped with cell phones, in the hope that they might be able via practical experience to create a coverage quality map. They hoped to collate data on where failures had occurred and see if there was any match. Putting our people in the police cars was, however, not very effective. It consumed manpower resources and the results were still inconclusive. What was also clear was that our mobile carrier knew as little as we did about performance in our area.

## Why Data About Mobility With Analytics Is Essential

"By chance, at the time this was a priority in 2010, I was attending a conference in Denver. I ran into the CEO of a local Colorado company called Mobile Pulse. I described the issues and the fact we were finding ourselves unable to solve the problem because we lacked data to analyze. It emerged that analysis of actual mobile data network performance was the focus of the Mobile Pulse tool.

"My reaction was -- as you might imagine -- wishing we could have access to such a tool. After some discussion, Mobile Pulse offered us a short trial to see if its software would tell us anything.

"The way that Mobile Pulse works is simple. Essentially, you load a small client app onto cell phones or laptops or other mobile devices. This gathers information (you can set the parameters so that you capture as much or as little data as you wish) about the throughput of the mobile network as the device moves around. At pre-set intervals, the device uses the cellular network to send the captured data to a secure portal in the cloud. Users then remotely access their data via a browser/dashboard to analyze and map the results.

"We installed the software on the laptops. But we went further. We wanted to be able to compare what other local carriers offered and see if their performance was better or worse. We:

1. **Borrowed some phones from two other mobile network providers.** Both were happy to cooperate, in hopes of displacing the incumbent provider.
2. **Installed the Mobile Pulse software on the borrowed cell phones.** Its app is independent of all other apps and is configurable.

3. **Mounted the phones in the police cars.** This was as simple as attaching them in the car with Velcro pads, powering them through the vehicle's electrical system and then telling the officers to ignore them.
4. **Sent out the police cars on normal patrol.** Now we could start gathering data about all three carrier networks. We ran this for a couple of months.

## The Results Surprise

"Within three to four weeks, we had some really good data points, which we further improved in the second month of data capture. Using the Mobile Pulse dashboard, we analyzed the results and mapped it out over the Castle Rock area. Then we stood back to see what we had found...

"The major surprise was that, overall, our existing provider performed at 50 percent of the speed of other providers. In addition, we discovered that all three vendors had pretty much the same cell tower locations, which meant that their poor coverage areas were much the same. We could plot this onto a quality of service coverage map for Castle Rock.

"At this point, we went to talk to each of the vendors. Each one was amazed. We now knew more about mobile data network performance in Castle Rock than they did. From the perspective of our cellular connections, we had more detailed throughput results and coverage maps than they had. In subsequent conversations, it became clear that all three carriers welcomed what we had gathered -- and expressed the wish that other municipalities would do the same so that they (the carriers) could plan and deliver improved service in a more focused way.

"This produced one immediate result. On the spot, our vendor offered us a discount on our whole mobile data plan. Immediately, we were saving several thousand dollars a year. As far as we at Castle Rock were concerned, we were winning in two ways:

- **We understood in detail where the connection problems existed.** The correlation with what officers had reported was strong. Now we could plan for the future and possessed the information and analyses to conduct informed negotiations with the carriers.
- **We reduced our direct costs.** This was not by a huge amount, but it was significant for our town, given how much we were spending per month on communications.

"We also asked each of the carriers about their future plans for improving mobile data services in Castle Rock. The carriers said that they did not expect to upgrade the existing mobile data capabilities to LTE (Long Term Evolution or 4G) for at least another 12 months, nor to improve coverage in areas with poor quality of service. That was disappointing, although there was an unexpected aspect. We still had a few devices running the Mobile Pulse client. Shortly after our review, we noticed cell tower locations

providing LTE. Though I cannot say whether the carrier sped up the upgrades because of our discussions, the coincidence is curious.

"Our next decision was to switch the laptops in our police cars over to a different carrier. The faster download speeds make a difference to the officers in the police cars when they are in good coverage areas. But this has not resolved the problems in the poor coverage areas. We are still struggling with dropped connections, but we plan to use Mobile Pulse to help evaluate other technology to overcome poor cellular coverage. Because the town approves the siting of additional cell towers, the Mobile Pulse solution will help us ensure future antennas fix the problem areas.

"We also decided not to move wholesale away from the current network provider, for various reasons. In my view, our current vendor gives by far the best customer service of any of the mobile carriers. One proof point was that immediate offer to reduce our monthly plan costs. The carrier also shared how it plans to develop and improve services across Castle Rock and, though this will take time, we believe it will benefit us long term and solve most of the coverage problems."

## Lessons Learned and Best Practices

Many mobile users face similar experiences to Castle Rock's. Kevin Capp provides five key lessons learned:

1. **Do not expect your carriers to know their network coverage areas.** "Do not expect your carriers to have good quality-of-service maps or an understanding of what your average throughput will be on their networks for your area. It may seem surprising, but carriers don't have good data about the quality of service in your area."
2. **Data collection is expensive.** "Gathering this data on mobile network performance is neither simple nor cheap. The traditional way is to hire an organization to drive around with sensors and build you, or the carriers, a quality-of-service map (though this will likely not represent true operational usage). In practice, using our own equipment -- the laptops and cell phones in the police cars -- provides real-life, in-use data, at a fraction of the cost of retaining a third party. In our case, we were fortunate to run into Mobile Pulse, who could provide a cost-effective solution with a return on investment for the town."
3. **Planning and execution require good data.** "Having the data we possess now really helps planning and execution. Castle Rock is preparing a request for proposal for mobile communications. We can now include specific quality-of-service requirements plus ask for contractual commitments for specific improvements. Perhaps, within a given time, poor coverage areas will disappear. This is not just about Castle Rock government. It is also a service to our citizens -- if they obtain improved service. Of course, for this to work, we will need to be able to measure what is in effect a Service Level Agreement with the carrier."

4. **Do not rely on one carrier.** "A best practice that I am personally interested in would involve Castle Rock residents, if they are willing. My reasoning runs like this. In the past, we had one contract with one carrier. But it might be that multiple carriers or services would suit the town better. We can't keep test devices for measuring all the different carriers in town."
5. **Think about crowdsourcing a service map with citizen input.** "We do have citizens who use the different carrier networks. If a selection of those citizens would be willing to install the Mobile Pulse client on their devices and accept that a part of their data plan would be used for these tests, then we would have an ongoing basis for multi-carrier comparison. You could regard this as an inside-out form of SETI (the distributed analysis of data in the Search for Extra-Terrestrial Intelligence) -- with many mobile devices gathering data for subsequent performance analysis. It might even be a service that local governments should provide for their citizens. After all, the citizens have the mobile devices; it is government (and citizens) that can benefit from the performance data."

## Actionable Advice: Follow These Seven Steps to Success

The Castle Rock experience illustrates how mobile data carriers do not always know how their own networks function in practice. It also shows how a lack of data about mobile network performance can cause operational problems, as was the case for Castle Rock police officers.

We have taken the input from Castle Rock's CTO and combined it with other Constellation Research experiences and findings. So we present the following steps to help you significantly improve your enterprise's ability to succeed with the new world of mobility:

1. **Accept that mobility is here to stay.** Enterprises can try to resist mobility. It might work, but more likely is already futile. Better results will arrive if enterprises signal acceptance early and adapt to encourage use of mobile devices.
2. **Quantify what your users are already using.** This is multi-dimensional. It is about knowing what mobile devices are being used, and how, with your IT systems. It is also about knowing whether, for example, enterprise mobile data plans are really delivering for the business. Think about whether what you discover represents an operational or even a business risk. Then act.
3. **Introduce a mobile device management framework, and automate it.** Automated policy enforcement is much easier than a manual one. But it does require preparation, communication (to employees) and then application into a policy engine. The effort is worth it, not least in assuring impartiality.
4. **Measure, measure and measure.** Enterprise mobile voice and data plans are becoming an increased expense, as well as contributors to business process and



productivity improvements for the future. Without relevant data to analyze, enterprises will not know what value, and costs, they are incurring -- which will make constructive business decisions much harder to make. Look for new ways to measure, preferably automated ones with analysis tools.

5. **Exploit the knowledge of mobile management specialists.** Mobile device management on an enterprise scale requires deep knowledge of mobile device issues, including security as well as cost management. There is no point in reinventing what others can do for you at much less cost and with much less effort - unless you are a huge enterprise with special needs that believes it has to do everything itself.
6. **Consider mobility to be a strategic business opportunity.** Mobility beyond simple phone functions opens up information and delivery options. The more open the enterprise "mind," the greater the payback.
7. **Remember to be friendly.** In the past, the IT department has prescribed policies and proscribed activities because it owned the technology within a company. That will no longer work and may even be a reason to consider making another, more employee-friendly department responsible for the management of mobility, albeit within an IT-designed envelope. Do not assume that traditional systems management tools apply to mobility; most are inflexible and better suited to data centers than employees wielding mobile devices.

## Disclosures

Your trust is important to us, and as such, we believe in being open and transparent about our financial relationships. With our clients' permission, we publish their names on our website.

# Analyst Bio: Charles Brett

## Mobile and Infrastructure Strategist for Enterprises, Blended with CoIT

Charles Brett is currently Vice President and Principal Analyst at Constellation Research, Inc. For more than 25 years, Charles has focused on delivering common sense to the application of technologies, especially software, in organizations of all sizes around the world.

### Expertise

Charles' primary areas of focus at Constellation Research are mobility management and technology optimization in the enterprise, including Mobile Device Management (MDM) and Bring Your Own Device (BYOD). He has consulted and worked with users and vendors on high-performance, low-cost processing, including organization-specific, cloud-like computing, event processing/complex event processing (especially when combined with GPS), enterprise architecture, including automating the discovery and management of applications, plus integration of diverse systems, virtualization, and how to cut costs and electronic publishing. He has an ongoing interest in automated metering for the electricity, gas and water industries.

Specific sectors of interest and experience include finance (especially systems supporting wholesale finance), telecommunications and energy and its conservation.

### Media Influence

Previously, Charles was the Editorial Director of *MIDDLEWARESPECTRA* (now published as *INSIGHT-SPECTRA*), a journal focusing on the use of software, especially integration with its multiplicity of middleware technologies.

Charles has been a regular at multiple industry conferences and has written for numerous publications including *The Times* of London and the *Financial Times*. He was the General Chair in 2005 of the bi-annual High Performance Systems Workshop.

He is also the author of "Explaining iTunes, iPhones and iPads for Windows Users," (2011) and "The 5 Axes of Business Application Integration" (2004).

### Education

Charles has an M.A. and B.A. in Modern History from the University of Oxford.

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# About Constellation Research

Constellation Research is a specialty research and advisory firm that serves business leaders who seek to unleash the power of emerging and disruptive technologies. Our research analysts start by understanding the business objective, applying real world experience and insights and then incorporating disruptive technologies and innovative business models as appropriate.

We cater to boards of directors, C-suite executives, and line of business leaders looking for an edge in business model and technology innovation. We help our clients combine the disruptive and traditional technologies in solving the tough business problems. Most importantly, our research outputs always provide an insightful buy-side point of view. We look forward to serving you with Insight, Inspiration, and Impact.

We're business leader and business value focused. Constellation Research differentiates itself by:

- Focusing on the boardroom and C-suite point of view. Constellation's research addresses the needs of boards, CEOs, CFOs, CIOs, CMOs, CHROs, CPOs, CSCOs, and COOs.
- Addressing the business problem first. Research starts by addressing business value and then applying where disruptive and emerging technologies may play a role.

## Organizational Highlights

1. Founded and headquartered in the San Francisco Bay Area, United States, in 2010.
2. Named Institute of Industry Analyst Relations (IIAR) New Analyst Firm of the Year in 2011.
1. Serving over 100 buy-side and sell-side clients around the globe.
2. Growing firm with 31 members including 14 research analysts and futurists, 5 sales professionals, 5 professional staff, and a board of 7 industry-recognized advisors.
3. Experienced research team with an average of 21 years of practitioner, management, and industry experience.
4. Creators of the Constellation Supernova Awards - the industry's first and largest recognition of innovators, pioneers, and teams who apply emerging and disruptive technology to drive business value.
5. Organizers of the Constellation Connected Enterprise - an innovation summit and best practices knowledge sharing retreat for business leaders.

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# Endnotes