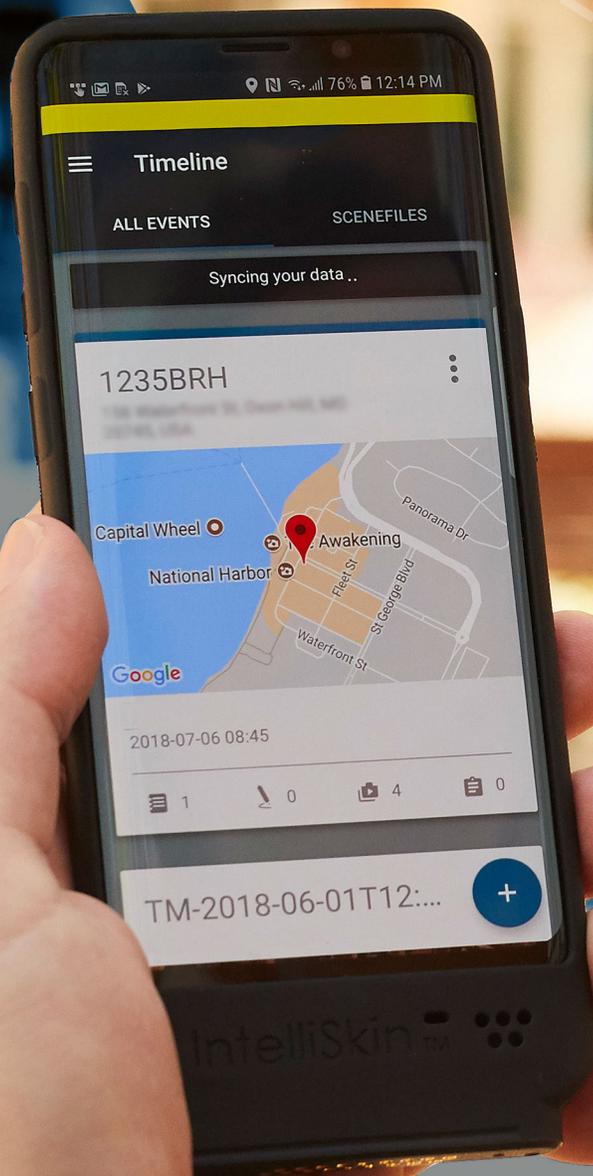


Bringing Mobile First to Public Safety

A case study on
Samsung's DeX solution



Bringing Mobile First to Public Safety

Executive Summary

With the ability of public safety to now truly leverage broadband wireless mission critical communications, the current dynamic mobile communications technology landscape is shifting the public safety market from a focus on large, fixed infrastructure projects to a mobile first approach. This shift recognizes the mobile nature of first responders and the need for the technology they use to be fully accessible in and architected specifically for this mobile public safety environment.

The benefits of wireless broadband and mobile technology in public safety are numerous:

- Access to innovative mobile devices and platforms
- Ability to fully and securely take advantage of the cloud
- Increased use of “as a service” capabilities (e.g., software as a service, platform as a service, etc.)
- Growing ecosystem of public safety applications
- Budget transition from large infrastructure capital expenses (capex) to operational expenses (opex)

In this white paper, we explore the capabilities and costs savings which can be realized in deploying new public safety mobile first solutions using Samsung’s new DeX mobile computing platform as a case study.

Samsung DeX is a new platform that enables Samsung’s most recent smartphones to power a desktop-like experience on an external monitor, keyboard and mouse whether in-vehicle or in the office. The DeX solution for public safety agencies replaces the in-vehicle laptop, and can be used by officers to connect to docking stations upon return to the station for a seamless computing experience.

Leveraging a single device in the field, vehicle and office, law enforcement, fire and EMS personnel can:

- access computer aided dispatch (CAD) and respond to calls
- monitor situational awareness data
- record photos, video and data
- complete necessary reporting

This mobile first capability enables public safety to access and transmit necessary information from any location at any time. In addition, in analyzing the technology expenditure of one mid- to large-sized agency, we found that the transition to Samsung DeX could save more than 15% in annual expenditures in year 1 and 30% thereafter compared to current in-vehicle and in-office computing solutions.

The bottom line? Mobile first technologies can provide greater operational capabilities at lower overall cost over currently utilized communications and computing technologies, enabling first responders to spend more time doing what they do best – saving lives.

Mobile first Cost Savings using the DeX Platform



The Public Safety Network has relationships with clients focused on empowering public safety with life-saving technologies, and periodically receives compensation to fund content. This white paper was funded by Samsung. The views, analysis, research, and opinions contained herein are our own unless otherwise specifically noted.

The Move to Mobile First

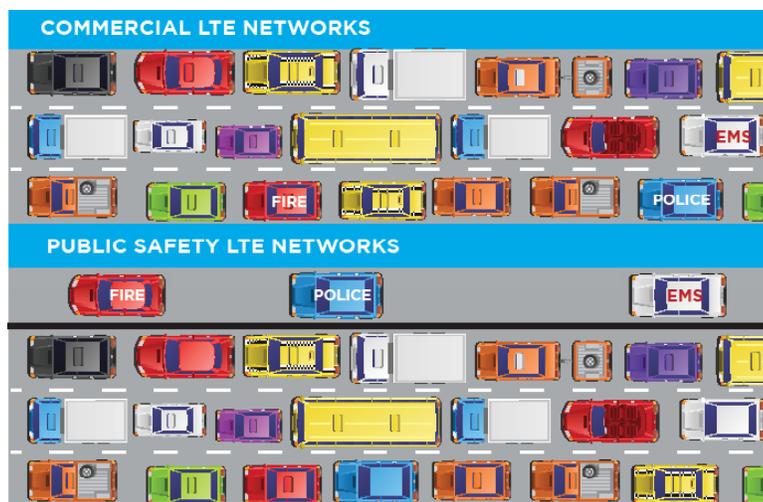
Historically, public safety has relied on land radio systems, such as TETRA, TETRAPOL, and P25 for mission critical voice communications. While these technologies have provided reliable narrowband communications, they are limited in their ability to leverage more modern broadband technologies and to allow public safety to benefit from video and high bandwidth data.

During this same time, wireless broadband technologies have advanced significantly, particularly with the deployment of long-term evolution (LTE) cellular services, and the anticipated roll out of 5G architectures. However, even these technologies have not been designed to provide the mission critical communication capabilities public safety has been able to rely on.

With the rollout of the first nationwide broadband LTE network purpose built for public safety, first responders are now able to leverage the complete ecosystem of broadband technologies in order to more effectively perform their jobs and protect our communities. So, what specifically has changed? Quite a bit.

Until recently public safety has shared the same cellular networks with enterprise, commercial and other users without the ability to leverage true priority and preemption capabilities. What this means is that during emergencies or other heavy use, the network would get throttled (data would slow down), and in cases of very heavy use, the network would not be available to complete calls or exchange data at all.

The Benefit of Public Safety LTE Networks



For a mobile emergency workforce that is reliant on the ability to communicate to save lives and protect property, public safety needs unbridled access to high data speeds at all times.

However, the availability of LTE capabilities that always ensure connectivity for public safety has now solved this problem. This new capability will always prioritize public safety traffic over all other traffic, ensuring that public safety is able to communicate without delay or impediment even during heavy network use. Because of this guaranteed availability, public safety is now able to rely on broadband communications that are encrypted end to end, and for the first time to fully utilize a growing inventory of dedicated public safety-specific applications. These applications will include for example, (i) mission critical push to talk and peer-to-peer capabilities, (ii) situational awareness and mapping capabilities, (iii) secured cloud-based communications platforms facilitating digital evidence collection and records management, and (iv) new analytics tools.

The Mobile First Impact on Public Safety Purchasing and Capabilities

In the public safety arena, several recent notable technology shifts have occurred, which are driving the adoption of cutting-edge technologies not previously available to public safety, and facilitating the creation of new applications, services, devices and storage capabilities that are revolutionizing public safety operations. With prioritized network access on public safety LTE networks and innovative capabilities, first responders now, more than ever, can

- leverage cloud applications and storage for their operational and administrative needs
- streamline their workflows
- facilitate access to critical information
- use multiple devices (such as smartphones, tablets, and smartwatches)

These capabilities give first responders more valuable time in the field with the communities they serve.

For the first time, public safety has the capabilities to operate in a truly mobile fashion without the tethers of historically restrictive technology limitations and they now can have true operability across functions and agencies.

The ability to leverage broadband technologies is creating a true paradigm shift from static, capital-centric purchasing and fixed location operations to a true public safety mobile first environment. Traditionally public safety has been tied to its own infrastructure and office facilities, requiring first responders to adapt their behaviors and operations to accommodate the extent and location of the technology available by their respective departments. Such technologies have included:

- closed private LMR networks, which are geographically limited and not interoperable with other agencies
- on-site servers and data storage and processing which have limited accessibility, and are expensive to maintain
- office computing resources which have been necessary for reporting and administrative functions
- separate, stand-alone computer functionality and hardware used in the vehicle for computer aided dispatch, checking vehicle and criminal records, issuing citations, etc

Now, with the availability of nationwide public safety wireless broadband networks, these constraints are eliminated. Public safety can now focus their time and efforts where they need to be — in the field — and their technology will adapt to their needs rather than the other way around. This includes the ability to:

- communicate with any other agency nationwide no matter location
- always have access to necessary data through reliable connectivity to the cloud regardless of location
- complete reporting, evidence collection and administrative tasks all from a smart device in the field

All of these communications have the ability to be fully interconnected with all other agency systems, including record and evidence management, dispatch, citation management, and 911, accessible by all authorized personnel no matter their location.

For the first time, public safety has the capabilities to operate in a truly mobile fashion without the tethers of historically restrictive technology limitations and they now can have full operability across functions and agencies. This mobile first environment also enables the ability to utilize the latest software and hardware capabilities, inclusive of future upgrades through new “as a service” offerings, which also help to optimize annual operating expense budgets through the purchase of monthly or annual services plans.

The shift to mobile will have a positive impact on municipal budgets by reducing large capital expenditures and increasing speed and flexibility of technology deployments.

In addition, public safety agencies have access to nationwide local government purchasing contracts which enable the acquisition of new technologies more quickly and based on volume offerings. The cooperative purchasing organizations that oversee these contracts manage the entire RFP process — from issuance to vendor award — in order to secure the most competitive vendor pricing for products and services required by local governments, including their public safety agencies. What this means is that local agencies can leverage the purchasing power of these high-volume contracts to buy what they need at the lowest price without incurring significant costs and staff time to administer numerous individual RFP processes; that work has already been done.

In addition to the reduction, and in some cases elimination of necessary up front capital investments for “as a service” offerings, other benefits include:

1. Built-in innovation and upgrades to software and technology; no “forklift” upgrades
2. Scaling user subscriptions based on the size and demands of each public agency (only purchase what you need)
3. Evenly distributing the costs of the required technologies on a monthly basis for more stable cash flow and financial predictability
4. Capital maintenance and upgrade costs provided as part of the “service” and rolled into a low per user cost
5. Minimal administrative, and reduced operational oversight with more automation to streamline workflows

Samsung DeX: A Real World Example of Mobile First

Now that prioritized, wireless broadband services are available to public safety, several companies are already offering new and innovative technologies enabling more effective, safer, and cost-efficient agency operations. One extremely promising new solution is the Samsung DeX mobile computing platform for public safety. Samsung DeX delivers mobile computing by pairing Samsung smartphones with a vehicle dash-mounted display and hardened keyboard. The Samsung smartphone and DeX can also be connected to a full-sized monitor, keyboard and mouse in the station environment. This replaces the legacy combination of phones, radios, expensive in-vehicle laptops, and desktop computing facilities back at the station by effectively powering all of these functions from a single smart device.

Law enforcement, fire and EMS personnel can access the computer aided dispatch (CAD) from their vehicle or mobile device; respond to calls; monitor situational awareness data; record photos, video and data; and complete necessary reporting, all from smartphones in the field. Many CAD companies have created Android mobile platforms that seamlessly and securely work on Samsung mobile devices. The data they collect on the smartphone from the field can then also be accessed from the vehicle simply by slipping the phone into the DeX in-vehicle cradle mount and utilizing the full-size keyboard and high-resolution display. DeX optimizes applications and information to make full use of the in-vehicle display, rather than simply expanding the smartphone interface. This allows critical information to be viewed quickly while also enabling law enforcement, fire and EMS personnel to complete all tasks from wherever is most convenient — on patrol, an incident scene, or the hospital. When it's time to head back to the station, just place the smartphone into the DeX docking station and now all information collected in the field and in vehicle can be displayed and accessed seamlessly on the office monitor. DeX truly facilitates the ability for first responders to remain in the field, productively mobile within the communities they serve, for both operational and administrative functions.



REPLACE:
Scanner, Laptop, Desktop
Video Recorder, Audio Recorder,
Camera, LMR, Signature Capture

WITH:
Samsung Smartphone with
DeX In-Vehicle Monitor
and Keyboard

In-Station Hot Desk with Monitor,
Keyboard and Mouse

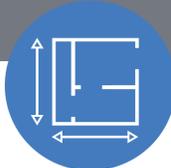
Cost Reduction Through Transition to Samsung DeX

Although new technology platforms, like Samsung DeX, bring innovative capabilities to public safety, cost remains a critical consideration for all agencies. Even the best widget in the world becomes useless if no one can afford it. This is the true beauty of the new broadband wireless ecosystem now available to public safety. Because this technology already exists and has been ubiquitously used in the mass market, leveraging existing telecommunications infrastructure, the associated incremental costs to the public safety community are minimal. It is the economies of scale already built into the network and the devices that ride over it that will in fact reduce overall costs over historic investments necessary for closed, proprietary agency infrastructure and networks.

This result is borne out by implementation of cost savings mobile first solutions like the Samsung DeX platform as illustrated by the example in Table 1 on following page. What platforms like this effectively do is integrate all necessary computing power and capabilities into a single smartphone leveraging the cloud for data storage and access. This has the effect of significantly reducing, and potentially eliminating, the need to purchase and maintain separate desktops, in-vehicle laptops, and on-premise server infrastructure, which can all be replaced by a single smart device and the DeX platform. While there are costs associated with managing and maintaining mobile devices and associated software, we have found that in general the total cost of ownership (TCO) for an integrated mobile first platform is significantly lower than the TCO associated with purchasing and maintaining traditional desktops, in vehicle mounted laptop systems and handheld terminals serving the same personnel. The result is significantly reduced capital, upgrade, and maintenance costs in favor of more manageable operating expense purchases on an as needed basis per personnel. This allows for streamlined training and reduced software licensing costs.

It is the economies of scale already built into the network that will reduce overall costs.

New and Emerging Public Safety Operational Capabilities

1 Newly equipped smart devices that can replace vehicle mounted laptops and station desktops.	2 Encrypted communications platforms that are able to separate professional and personal talk, text, photo, and video usage on smartphones.	3 Enhanced capability to pinpoint mobile 9-1-1 caller locations.	4 Electronically issued e-citations and the real time uploading of evidence and incident reports from the field.	5 Accessible building floorplans en route to a building fire.	6 The sharing of integrated patient data and high definition video from a moving ambulance to the emergency room.
					

**TABLE 1: Year 1 and 2+ Cost Comparison:
Existing Public Safety Communication Solution vs DeX¹**

Agency Expenses – Year 1²	Station Desktop	Rugged Vehicle Laptop	Rugged Smartphone³	Samsung DeX
Equipment Cost (<i>one time</i>)	\$800	\$3,905	\$400 ⁴	\$425 ⁴
Installation/Prep Cost (<i>one time</i>)	NA	\$1,385	NA	\$2,400
Monthly Service Cost (<i>annualized</i>)	NA	\$444	\$300	\$516
Maintenance Cost (<i>annualized</i>)	\$380	\$380	NA	NA
Total Cost (<i>annualized</i>) ⁵	\$1,180	\$6,114	\$700	\$3,341
Annual Cost Based on Number of Assigned Devices (<i>annualized</i>) ⁶	\$1,505,680	\$5,258,040	\$441,700	\$6,097,325
Total Annual Cost – Year 1: Existing Solution vs DeX	\$7,205,420			\$6,097,325
Agency Expenses – Year 2+ (until equipment replacement)	Station Desktop	Rugged Vehicle Laptop	Rugged Smartphone³	Samsung DeX
Monthly Service Cost (<i>annualized</i>)	NA	\$444	\$300	\$516
Maintenance Cost (<i>annualized</i>)	\$380	\$380	NA	NA
Annual Cost Based on Number of Assigned Devices (<i>annualized</i>)	\$484,880	\$708,640	\$189,300	\$941,700
Total Annual Cost – Year 2: Existing Solution vs DeX (until equipment replacement)	\$1,382,820			\$941,700

¹ Actual costs, totals and savings will vary by agency.

² Public safety's existing comprehensive communications solution is typically comprised of several devices: a station desktop, a vehicle laptop, and a smartphone, the latter two of which require separate wireless service plans.

³ Costs listed are for "rugged" devices only; costs associated with non-ruggedized devices may impact costs of DeX replacement.

⁴ \$1,000-\$1,500 smartphone list price offset by carrier incentives.

⁵ Based on mid-size to large department consisting of approximately 1,800 personnel with 70% having desktops, approx 50% having vehicle laptops, 35% having ruggedized smartphones

Samsung DeX Cost Implications

Table 1 represents a business case for replacing in-vehicle laptops, office desktops and related infrastructure with a Samsung Smartphone and DeX Mobile Computing Platform. The costs highlighted in Table 1 are based on a mid to large size department consisting of approximately 1,800 personnel. Approximately 70% of these personnel are issued desktop PCs, 50% have vehicles with rugged laptops, and 35% have been issued ruggedized smartphones.

Our model assumes that:

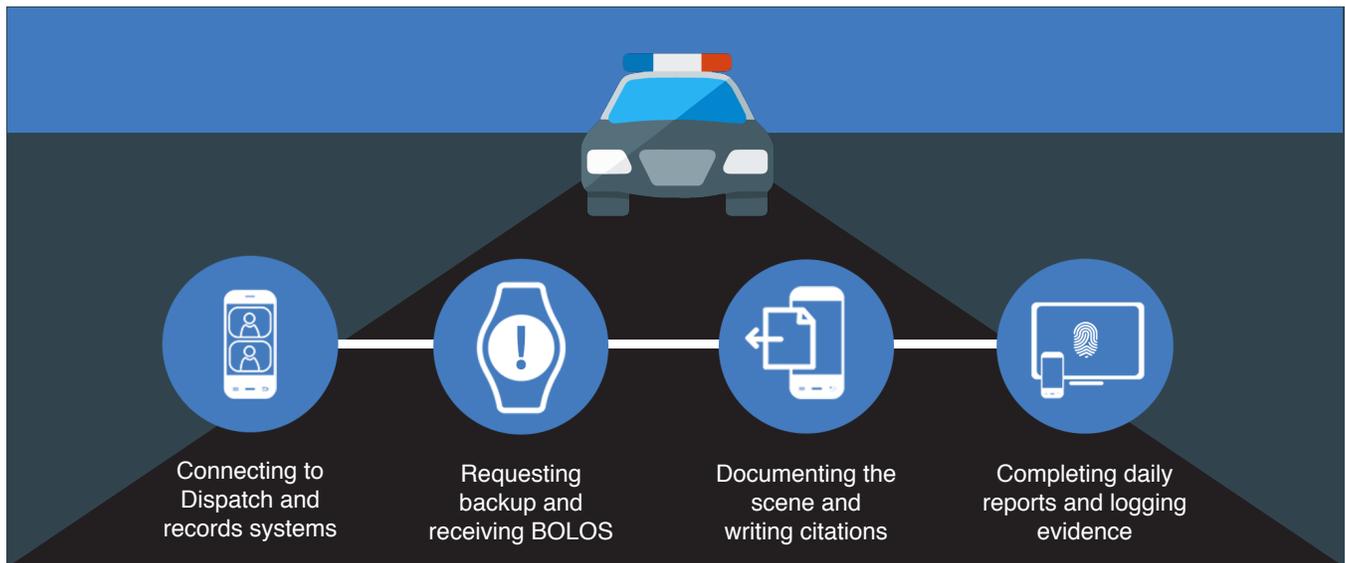
- All officers will be issued Samsung smartphones capable of supporting computing via the DeX platform
- Desktop PCs are phased out and officers instead connect their phone via DeX to perform reporting tasks at the station
- All vehicles are outfitted with Samsung's DeX in-vehicle solution including a touch screen monitor and hardened keyboard

Key findings are as follows:

- The transition to mobile first infrastructure with DeX reduces costs from \$7.21 million to \$6.10 in year one of a refresh cycle, a greater than 15% reduction
- In subsequent years, costs are reduced from \$1.38 million to \$941,700 annually, a 32% reduction
- Over a three-year lifecycle, blended costs are reduced in aggregate by greater than 20%

This analysis demonstrates potential for significant savings from a transition to smartphones and Samsung DeX, while increasing the officer's mobile computing access and capabilities. The ultimate financial impacts of the transition to mobile first will vary from agency to agency, and it is critical that each department carefully review its current IT budget and actual expenditures to fully understand the costs of existing technology configurations and where improvements can be made.

Day in the Life | Mobile First Responder



Streamlining Workflows with Samsung DeX

Mobile first benefits users by providing a single device that unifies workflows and computing experiences. First responders are one of the most mobile workforces and rely on their mobile devices to work anytime, anywhere to maximize their time spent in the field, providing assistance and lifesaving interventions as quickly as possible when emergencies occur. Efficiency, the convergence of capabilities, and ability to remain in the field are key considerations for public safety.

Security is another important consideration with a mobile first workforce and inventory. Today's public safety wireless broadband networks are being architected with end to end encryption and enhanced security so the transmission of data from the field is protected. In addition, the DeX platform supplements existing network security by utilizing the latest generation of Samsung smartphones, which are equipped with significant additional security features and capabilities designed for first responder use, including:

1. Application sandboxing
2. Work/personal protected application containers
3. Trusted execution environment (TEE) hardware
4. Full-disk encryption
5. Biometric sensors
6. Mandatory access controls
7. Tight integration with mobile device management (MDM)/enterprise mobility management (EMM) agents

This results in fewer alerts, fewer, less expensive, and less time-consuming security incidents, tighter control on application-based malware, simpler system management, and a better approach to end-user computing security. Samsung's Knox platform, which is embedded into the latest Samsung devices, for example, consists of overlapping defense and security mechanism that protect against intrusion, malware and more malicious threats. Use of the next generation of mobile first equipment over currently available public safety networks provides security redundancy which should provide all first responders with an increased level of comfort in relying on such systems for mission critical communications.

Conclusion

There are extremely positive financial and operational impacts across the board with a move to a mobile first approach for public safety. As the example in Table 1 illustrates, as the move from existing tethered computing resources to a mobile first platform such as the Samsung DeX mobile computing solution, both initial purchase and installation costs, and ongoing costs to maintain and operate the technology were significantly reduced. The savings for the representative agency amounted to more than \$1.1M in year one (more than a 15% cost reduction) and more than \$440,000 annually thereafter (a 32% cost reduction per year). This realized cost savings can then be used by agencies to invest in additional technology and capabilities, including increased agency highlighted in this paper issued smartphones, new wearable technology, IoT connectivity, upgrades to CAD systems and next gen 911. Ultimately, this mobile first shift creates a synergistic cycle consisting of (i) improved capabilities, (ii) reduced capital expenditures, and (iii) the ability to reinvest available budgetary dollars in additional mobile first devices and technology....and the cycle continues.

With the increased capabilities associated with mobility, and widespread use by first responders of mobile devices both in their personal and professional lives, public safety will have more time to protect our communities and respond more quickly and effectively to emergency calls. It is estimated that more than 30% of an officer's time, for example, is spent on administrative paperwork. With a mobile first solution, there will be significant operational efficiencies gained that will make a real difference in the amount of time officers spend on reports and in the office, rather than in their communities, where they want to be.

In summary, implementing a mobile first smartphone solution with docking station like Samsung's DeX platform for the office and patrol car will likely result in significantly reduced costs and increased operational capabilities. With the availability of prioritized wireless broadband networks for public safety, there should be no delay by agency decision-makers in transitioning to a mobile first approach in serving its first responders.

The rapid progress of technology is allowing public safety to respond and provide emergency assistance more quickly and effectively than ever before, and at a price point that public safety can afford. Now that's a win-win.