

FirstNet and Washington OneNet
Frequently Asked Questions
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FirstNet™



FAQ FirstNet

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General Questions

What is FirstNet?

FirstNet is the First Responder Network Authority, a federal government agency part of the Department of Commerce. FirstNet was created by Congress in February, 2012¹, was licensed to use radio spectrum in the 700 MHz band, and was charged to create a nationwide wireless broadband network for use by responders to daily incidents and major disasters, with priority to First Responders. Congress funded FirstNet with \$7 billion from the licensing of other spectrum to commercial telecommunications carriers.

Will FirstNet replace existing voice radio networks used by police and fire departments?

These voice radio networks are known as “land mobile radio” or LMR networks. FirstNet will not replace LMR initially, although that may occur in the long run. LMR networks have several features which FirstNet will not have because standard LTE doesn’t support them today. These features include:

- “[push-to-talk](#)” or [PTT](#),
- simplex (also called direct mode, peer-to-peer, or [talkaround](#)),
- [high-power transmission](#), and
- mission-critical voice.

FirstNet, like many commercial wireless networks today, will support cell phone calling, one cell phone calling another or calling a land-line telephone.

Who can use FirstNet?

FirstNet is primarily a “first responder” network, but Congress intentionally allowed for any agency with a public safety mission to use FirstNet. First Responders are generally understood to be law enforcement, firefighting and paramedic agencies, plus 911 centers. Additional users might be transportation, transit, utilities (water, gas and electric), public works, elected officials, emergency management and other agencies, both public and private companies, which sometimes have a public safety mission. In this document the term “responder” refers to anyone who sometimes responds to a public safety incident such as these additional users. The term “first responder” refers to law enforcement, firefighting and emergency medical responders, whether local, state, tribal or federal, plus 911 centers.

Will FirstNet build a completely new network with cell sites and fiber networks separate from all the other networks?

No, absolutely not. FirstNet will issue an RFP, probably late in 2015 or early 2016, and seek one or more vendor partners to deploy FirstNet, largely using existing commercial cell sites, fiber optic and microwave networks connecting those sites, and other infrastructure already in place. FirstNet’s vendor(s) will put FirstNet’s electronics and antennas on those sites to create the separate FirstNet network, and will also upgrade many of those sites to “public safety grade”. After determining what infrastructure vendors have, FirstNet may use existing public safety radio sites owned by tribes, cities, counties, states and federal agencies, and in a very few cases might construct some towers.

¹ Public Law 112-96: <http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf>

Will FirstNet use satellites to provide service in remote areas?

Maybe. FirstNet has publicly committed to using “deployables” to bring a network to remote areas or places where extra capacity is needed. “Deployables” are units like a “cell on wheels” (COW), “systems on wheels” (SOW), “cell on light truck” (COLT) and perhaps even backpackable cell sites or cell sites carried on unpiloted aircraft (also known as “drones”) or balloons. These sorts of deployable units would create a cellular network in a particular area, for example a mountain canyon where a wildfire is burning. These units would still have to connect back to the larger nationwide network, which could use a satellite link or a link by microwave or other technologies.

This seems like Big Brother! Is the federal government coming in to take over our local, tribal and state communications?

LMR networks which serve cities, counties, states and other public safety agencies have historically been funded and operated at the local and state levels. King County, for example, on April 28, 2015, passed a \$246 million property tax levy lift to fund an upgrade of its public safety radio network. Public Safety broadband initiatives have developed over many years and have not been driven by federal mandate or political partisanship. In fact, local public safety leaders — both directly and through various associations — have petitioned diligently for spectrum and funding for a dedicated public safety network. Ultimately, each jurisdiction will weigh the pros and cons of participating in FirstNet and will make decisions which they feel best meet the needs of their public safety organizations. In other words, no city, county, state or federal agency has to use FirstNet — they will each need to make their own decisions.

What is the timeline for deployment of FirstNet?

This is an approximate timeline. Some of the elements of this timeline are “best guesses” by the Washington OneNet team and do not reflect the official position of FirstNet itself:

- February 22, 2012 – FirstNet created
- October 16, 2014 – FirstNet’s consultation work with Washington started
- April 24, 2015 – FirstNet issues draft of its RFP
- July 24, 2015 – Comments due on the draft RFP
- December, 2015 – RFP to be issued seeing commercial companies to build FirstNet
- June, 2016 (unofficial) – RFP responses due
- December, 2016 (unofficial) – FirstNet chooses but does not announce successful vendor(s) from the RFP
- 2017 (a complete guesstimate) – FirstNet takes input from the consultation and the results of the RFP and delivers a State Plan to the Governor for an opt-in/out decision.
- 2018?? – Deployment begins?

What is Washington OneNet and how is it different from FirstNet?

Washington OneNet is a team within the state government which coordinates FirstNet activities in Washington. Washington OneNet’s goals are to insure public safety agencies across Washington know about FirstNet (“education”) and to coordinate the involvement of responders and agencies to consult with FirstNet to produce a State Plan. Washington OneNet consists of a team of five state employees in the Office of the Chief Information Officer (OCIO) and the Washington State Patrol. The extended teams

includes employees of Washington State University (WSU) Division of Government Studies and Services (DGSS)² and the Pacific Northwest Economic Region (PNWER)³. The entire team and our contact information is at the bottom of this FAQ.

Financial Questions

How is FirstNet financed?

Congress funded FirstNet with \$7 billion from the sale of licenses to other chunks of spectrum. That spectrum sale, called “AWS3” occurred in 2014-2015 and grossed almost \$45 billion⁴. So FirstNet will have access to the full \$7 billion, none of which is taxpayer funds. Under the Act, the National Telecommunications and Information Administration (NTIA) will determine how much FirstNet can spend in each state. In addition to the initial \$7 billion, FirstNet can charge fees to using agencies and can sell excess capacity of its spectrum.

How much will it cost to build FirstNet?

The Government Accountability Office (GAO), in a 2015 report⁵, estimates FirstNet will cost \$12 billion to \$47 billion over the first 10 years. However the commercial telecommunications carriers in the United States spend \$30 billion⁶ *every three months* on capital expansion of their networks.

Will there be fees for the use of FirstNet and how much will they be?

Yes, FirstNet intends to charge fees to using agencies for the network. FirstNet senior executives have stated multiple times the fees have to be equal to or lower than the fees public safety agencies presently pay to their commercial carriers for unlimited data plans.

Will public safety agencies have to use FirstNet and drop their present commercial carriers?

No. There is no mandate in federal law or state law which requires the use of FirstNet. Indeed, the Washington Legislature would undoubtedly actively resist such a mandate. If responder agencies choose to adopt FirstNet, they could keep their existing commercial coverage, at extra cost of course. There is also the possibility FirstNet will include roaming to one or more of the existing carriers as part of its State Plan for Washington.

Does FirstNet have other sources of revenue?

The primary additional potential source of income is use by consumers and businesses. FirstNet itself cannot allow consumers and businesses to use its network. But it can engage third parties – commercial companies or states, as examples, to resell excess capacity (capacity not used by public

² WSU/DGSS: <http://dgss.wsu.edu/>

³ Pacific Northwest Economic Region: <http://www.pnwer.org/>

⁴ See FCC website for details: http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=97

⁵ GAO Report: <http://www.gao.gov/products/GAO-15-407>

⁶ Source for the \$30 billion: <http://www.wirelessweek.com/blogs/2015/04/lte-summit-fingers-bureaucracy-not-technology-firstnets-achilles>

safety). The use of this excess capacity will provide income, although the exact amounts are unknown but perhaps will become clearer when companies respond to the RFP.

Can FirstNet be sustainable?

That’s a great question and the answer is really unknown. Commercial networks such as AT&T, Sprint, T-Mobile and Verizon have 50 million to 100 million users over which to spread costs. Even if every first responder used FirstNet, and every other potential user (transportation, utilities, and public works) used FirstNet, the total user base would only be about 14 million over which to spread costs. On the other hand FirstNet doesn’t have to make a profit for shareholders and it doesn’t have to pay million dollar (or more) salaries to executives. In the pricing section of its draft RFP⁷, FirstNet is asking the apparent successful vendor(s) to both operate the network and to propose fixed payments (in return for using excess network capacity) to sustain the FirstNet program. Sustainability should become clearer as planning proceeds. The graphic below shows both consultation and the sustainability equation:



FirstNet Architecture and Design Questions

How will FirstNet be designed in Washington (the State Plan)?

In the law, Congress mandated FirstNet to produce a “State Plan” for each state. FirstNet is actively consulting with Washington to produce a State Plan. Anyone who is a responder or represents a public safety responder agency can be involved in the consultation process and give input to the State Plan. (See also the diagram showing [consultation subjects here.](#)) This consultation process will last through 2015 and 2016. The State Plan will probably be delivered in 2017, although that date is not firm. At the

⁷ The draft RFP is on the federal government business opportunities site here: <https://www.fbo.gov/index?s=opportunity&mode=form&tab=core&id=55fa4d3227d5ac0173e4613e04368c86>

same time, FirstNet will issue a Request for Proposals (RFP) seeking commercial vendors and partners to build the network. The RFP process will probably be completed at about the end of 2016. The responses to the RFP will also be part of the State Plan. When FirstNet presents the State Plan to Washington, the Governor will need to make a decision whether to accept it or reject it. (Sometimes called “opt-in/out”.) The Governor will rely heavily on input from responders, responder agencies and the SIEC in making this decision.

What is “consultation”?

In FirstNet-speak, “consultation” refers to the process of FirstNet staff working with responders in Washington to build the State Plan (see question above)⁸. Consultation started on October 16, 2014, with an initial meeting of FirstNet staff and about 160 responders from across the state. Consultation will continue, probably into 2017, in order to produce the State Plan. Under the Act, Congress mandated FirstNet⁹ to consult on certain topics. Such topics include what areas of the state will be covered, where the radio towers are placed, and how network priority is managed. FirstNet intends to consult on other topics as well, such as costs and fees, or who can use the network. Washington OneNet has established a committee structure to work with FirstNet on consultation and to advise the SIEC. The committees are:

- Stakeholder Committee
- Technical Committee
- Operational Committee

More information about the committee structure is on the [Washington OneNet website here](#).

What is this “opt-in” decision the Governor must make?

In the law, Congress required each state Governor to decide whether to “opt in” to FirstNet’s State Plan for deploying the network, or “opt out”. The Governor makes the decision after FirstNet presents the Plan, which will probably occur in 2017 (see previous question). Ideally responders from across Washington will be involved in the state planning process, FirstNet will listen to those responders, and FirstNet will get solid responses to their RFP. Then the State Plan should meet the needs of responders in Washington and the Governor can comfortably “opt in” and accept FirstNet’s State Plan. Responders involved in the planning process will advise the State Interoperability Executive Committee (SIEC) on the opt-in/out decision, and the SIEC will make a recommendation to the Governor. Important note: by “opting in” the Governor would NOT be committing any local, tribal, state or other agency to actually use FirstNet once it is deployed. That decision is still up to each individual city, county, or other agency.

What if the Governor opts out?

If the Governor opts-out of the FirstNet State Plan, the Law requires the State of Washington to build the radio access network ([RAN](#)) in Washington and link it to the FirstNet network. The State would have to pay for this itself, perhaps with a federal government grant for part of the cost.

⁸ For Washington’s view of consultation see <https://ocio.wa.gov/initiatives/washington-onenet-firstnet/committees>

⁹ For FirstNet’s view of consultation, see <http://www.firstnet.gov/consultation>

Why would the Governor opt out?

The only reasons the Governor might opt-out are if the FirstNet State Plan is clearly deficient, or if the State feels we could build a better network than FirstNet. Ideally responders from across Washington will be involved in the state planning process, FirstNet will listen to those responders, and FirstNet will get solid responses to their RFP, so the FirstNet State Plan will meet Washington's needs.

What will be unique about FirstNet? In other words, why would a police or fire department, or any other responder agency, use FirstNet rather than a Commercial network?

FirstNet will have a number of unique capabilities, for examples:

- Priority access. Today first responders and other responders have no priority on commercial networks. If they are overloaded during a disaster or even during a football game in a stadium, responders also have no access. With FirstNet, First Responders will have priority over other responders and also to any consumer or business users which might be on the network.
- Control of priority. FirstNet, as part of the planning process, will work with Washington to determine how priorities should be automatically adjusted during incidents and disasters. However incident commanders should be able to adjust the priorities on FirstNet as situations change. For example, electrical utility line workers may need priority access during extended power outages.
- Public Safety Grade. During disasters commercial networks will fail due to loss of towers, loss of power to the radio towers, cutting of the "backhaul" wires, fiber optic cable and microwave which connects towers to each other, and for other reasons. FirstNet will be better hardened to resist such problems.
- FirstNet will have a high degree of cyber security to protect sensitive information used by police, paramedics and firefighters.
- Interoperability and data sharing. FirstNet will improve situational awareness during an incident by allowing responders to see the "big picture" during an incident including how resources are deployed.
- As planning proceeds, other unique capabilities will become better understood.

The graphic below illustrates some of the unique capabilities FirstNet plans to bring to its network:

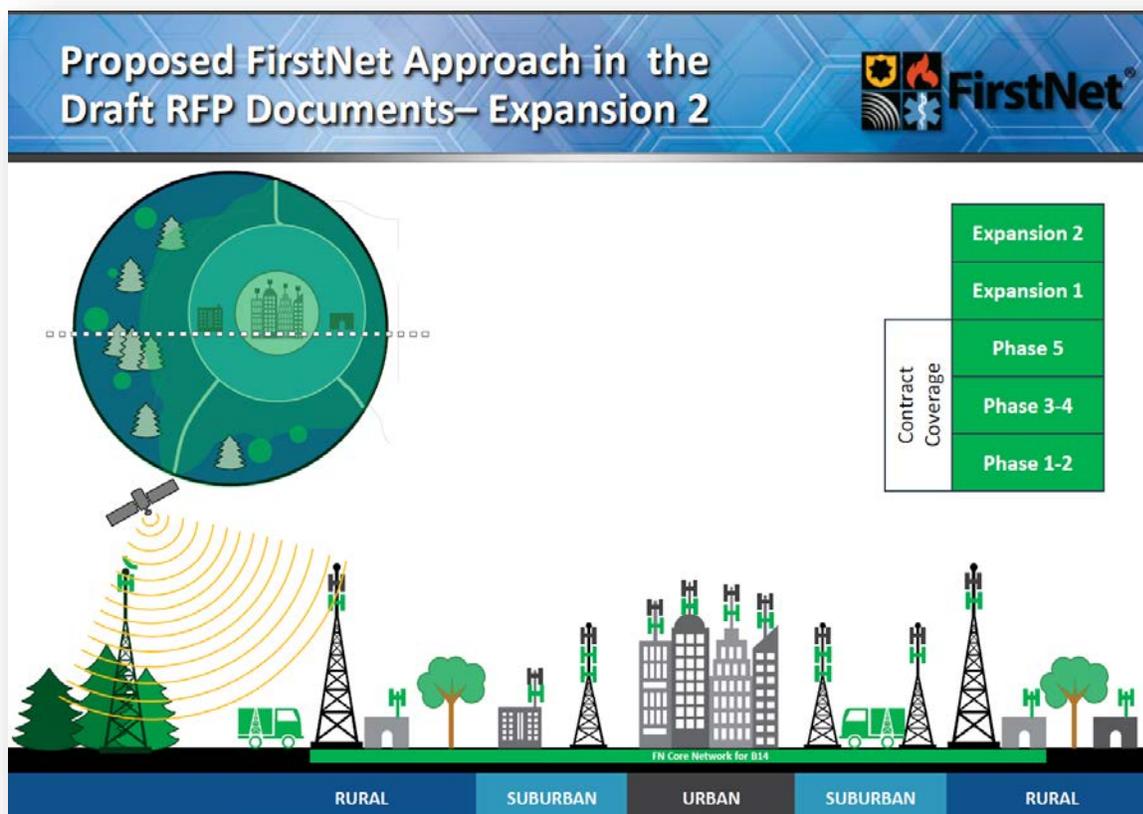


What areas will FirstNet cover in Washington?

Detailed coverage maps are still unknown, and will be part of the planning process. Representatives of responder agencies who are involved will be asked to specify where coverage is needed in their cities and counties. This final FirstNet State Plan will have detailed coverage maps.

When will FirstNet be available in Washington? Will it come online all at once?

This is really unknown, although a guesstimate is 2018 or shortly thereafter. FirstNet undoubtedly will be built in phases, and the phased deployment plan is part of consultation and will be in the State Plan presented to the Governor. FirstNet’s plan for a phased deployment, as presented in their draft RFP, is illustrated in the diagram below:



FirstNet Technology Questions

What technology will FirstNet use?

Congress mandated FirstNet to use standard commercial technology rather than a public safety-only technology like P25. Congress specifically used the word “nonproprietary” when describing the technology FirstNet must use. FirstNet will use LTE or long-term evolution¹⁰, which is a commercial technology being used in wireless networks worldwide. By using commercial, standard LTE, FirstNet can use the same radios, cell sites, switching and other electronics used by commercial telecommunications companies, thereby reducing cost.

¹⁰ LTE is sometimes called 4G or 4th Generation LTE, and is described in more detail here: http://en.wikipedia.org/wiki/LTE_%28telecommunication%29

What are LTE releases?

The 3rd Generation Partnership Project (3GPP) is a consortium of telecommunications carriers and others which creates the standards for LTE. LTE functions and standards are bundled together by 3GPP into different releases¹¹. The current release in use by many telecommunications carriers today is Release 9 (R9) or Release 10 (R10). Other releases are in the process of being developed, including R11, R12 and R13. Once a release and its bundled standards are finished by 3GPP, manufacturers decide which parts of the standard to include in their LTE equipment. Telecommunications carriers buy the equipment from the manufacturers and decide which capabilities of the equipment to use in their networks and to offer to users. So not every function and capability in the Release 9 standard, for example, will be found in either the LTE equipment or a commercial network. The Public Safety Communications Research (PSCR) office¹² of the federal government represents public safety's interests in 3GPP. Releases 12 and 13 of LTE will contain the elements necessary for standard mission-critical voice functions such as [push-to-talk](#) and [talkaround](#).

What are the components of an LTE network?

LTE telecommunications networks¹³ consist of several components:

- An evolved packet core (EPC or sometimes just called the “core”). The EPC is the “brains” of the network. It consists of a series of servers which do such functions as gateways from the wireless LTE network to the Internet and public switched telephone (PSTN) land-line telephone network, and validation of users and devices. A typical nationwide LTE network with tens of millions of users can be controlled by a single EPC, although most carriers have two or three EPCs for redundancy and resiliency.
- The radio access network (RAN). The RAN consists of sites interconnected with land-line networks. The RAN is also connected by multiple land-line paths to the EPC(s). Typically the land lines are fiber optic cables and networks, although in some remote areas the connections could be microwave. The sites are often radio towers (cell sites) but could also be distributed antenna systems or small cell sites inside a building, inside a home or even in a vehicle or on a balloon.
- The eNodeB's. Each cell site has electronics and antennas to send and receive transmissions to user devices. The electronics in a cell site are called eNodeB's.
- User devices. End user devices are smart phones, cell phones (sometimes called “feature” phones), tablet computers, mobile data computers in vehicles and, increasingly, a number of other devices such as sensors.
- Apps and applications, data servers. Technically, these are not part of an LTE network, but are the entire reason an LTE network exists. Apps on smart phones or computers are used for all tasks and functions a user wants to perform, such as make a voice telephone call, access a criminal history database, track the user's location or even play a game. Data centers of servers contain the databases and information accessed by apps. Such datacenters run, for example, computer-aided dispatch systems, records management systems and so forth.

¹¹ For a table of the LTE releases, see <http://en.wikipedia.org/wiki/3GPP>

¹² PSCR: <http://www.pscr.gov>

¹³ There are many sources with more detail on LTE network architecture, for example: <https://sites.google.com/site/lteencyclopedia/lte-network-infrastructure-and-elements>

What spectrum will FirstNet use for its network?

Congress granted FirstNet a license to use 20 megahertz (MHz) of spectrum for 10 years. This spectrum is in the 700 MHz band, 758 - 769MHz, 788 - 799MHz, which includes the "D-Block". This spectrum is also known as "Band 14"¹⁴. 20 MHz is a LOT of spectrum. 20 MHz is 20 million hertz. On an LMR network, a single voice channel typically uses 6,250 or 12,500 or (on older systems) 25,000 hertz. Furthermore 700 MHz frequencies are highly desirable by telecommunications carriers because devices operating at that band penetrate walls and buildings well, but yet don't require a lot of cell sites in order to build the network¹⁵. (See also [transmission power](#) below.)

What is push-to-talk (PTT)?

PTT is a feature of LMR networks where a public safety officer presses a button on a radio and can speak to all other officers and the dispatch centers which are using the same frequency or talk group. Standard LTE today does not support PTT, but future releases of LTE may do so. PTT apps on LTE exist today, but they are proprietary, not standardized. Some examples of PTT apps are Wave (by Motorola), BeOn (by Harris), and ESChat¹⁶. These apps are used by many public safety and other responders today on their commercial smart phones. Because Congress told FirstNet not to use proprietary technologies, FirstNet will not support PTT until it is standardized by 3GPP and those standards are implemented in networks¹⁷. PTT is often called "group communications".

What is talkaround?

Talkaround is also known as simplex, direct mode or peer-to-peer calling. Most LMR networks have this feature, where one individual radio can talk to other radios without needing to have the signal relayed by a tower. Talkaround is sometimes used by firefighters when fighting fires or police officers when conducting a search. Talkaround has limitations because of the relatively low power of individual radios (compared to a tower). Nevertheless it has advantages because the signal from radio might better penetrate walls and into basements of buildings than the signal from a distant tower. Commercial cellular devices do not support talkaround or direct mode. All transmissions must be relayed by a radio site, which could be a tower, microcell or even a small cell inside a home. Future [LTE releases](#) (R12 and R13) will contain provisions for implementing peer-to-peer communications like talkaround. In the world of commercial wireless this function is sometimes called "proximity services" because the user devices must be close to each other in order for talkaround to work.

How does the transmission power of LTE devices compare to LMR?

Most land-mobile radios transmit at a power of several watts, while LTE devices like smart phones transmit at about 250 milli-watts (about one quarter of a watt). LMR therefore has an advantage because an LMR network needs fewer towers to cover the same geographic area, because the individual radios can reach a tower which is more distant than an LTE cell phone. However LMR radios use more

¹⁴ See a list of LTE networks and their bands here: http://en.wikipedia.org/wiki/List_of_LTE_networks

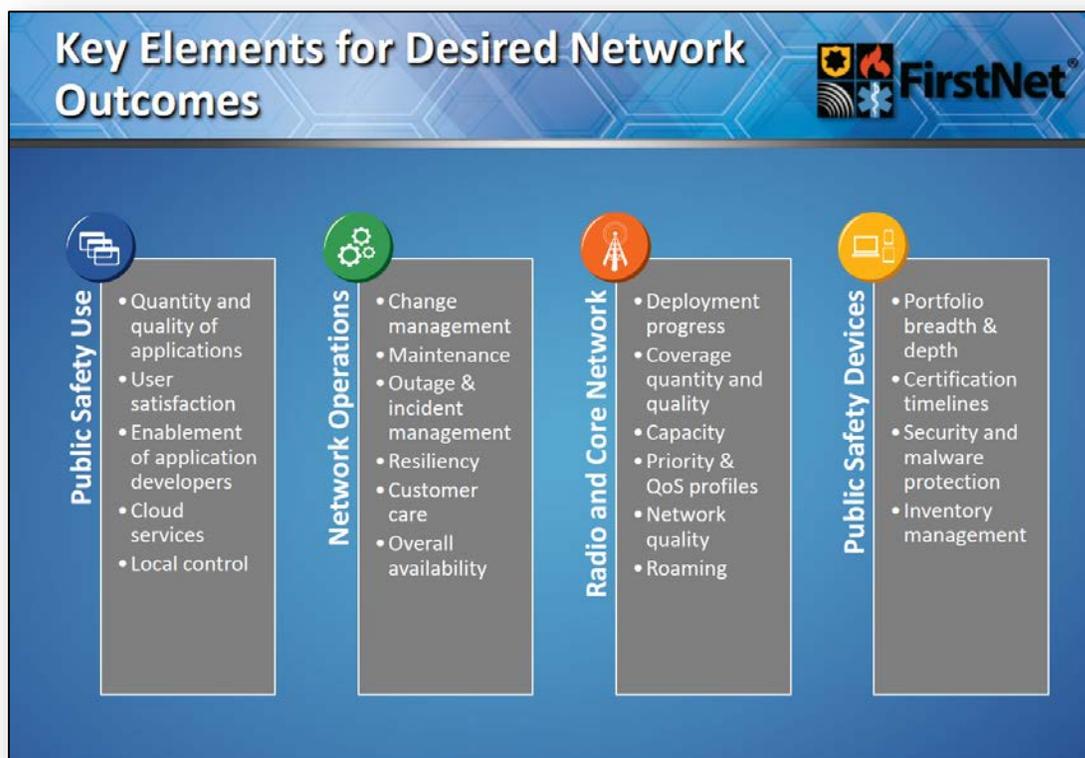
¹⁵ See more detail about the characteristics of the 700 MHz spectrum bands on the FCC website here: <https://www.fcc.gov/encyclopedia/700-mhz-spectrum>

¹⁶ ESChat: <http://www.sla-ptt.com/>

¹⁷ See also "What are LTE releases" and "What is push-to-talk" and "what is talkaround" elsewhere in this document.

power and therefore need larger batteries, which is why LTE devices can be smaller. King County's 800 MHz LMR network, for example, will cover virtually all the populated parts of the county including the major highways using about 40 radio sites. A commercial cell phone network would take several hundred sites to cover the same area.

What services will be in FirstNet's RFP?



Other Questions about Related Topics

How does FirstNet relate to WPS and GETS?

WPS is Wireless Priority Service¹⁸ and GETS is Government Emergency Telephone Services¹⁹. Both are programs which are overseen by the federal Department of Homeland Security. The goal of WPS and GETS is to allow government leader and responder priority use of the public switched telephone network during disasters. Responders authorized to use GETS can dial a special number on a land-line telephone to make phone calls at times when the telephone network is overloaded. WPS is a similar service for cell phones where the cell phone of authorized leaders and responders has been identified to the commercial wireless companies, thereby giving their calls priority during times when the cell networks are overloaded.

¹⁸ WPS: <https://www.dhs.gov/wireless-priority-service-wps>

¹⁹ GETS: <http://www.dhs.gov/government-emergency-telecommunications-service-gets>

Both WPS and GETS are used for voice phone calls on commercial networks. Both are available to first responders and other government users responsible for maintaining services during disasters. FirstNet, on the other hand, will be a wireless data network on its own network (spectrum), separate from the commercial networks, for access to applications, data and websites.

How does the FirstNet project relate to public safety voice radio interoperability?

A number of public safety radio networks exist in Washington. Many of them are operated by county governments or agencies established by interlocal agreement²⁰. The Washington State Patrol, Washington Department of Transportation, Department of Natural Resources, and Department of Corrections each operate networks as well. Then there are special purpose networks and frequencies. Many of these networks share infrastructure, e.g. radio sites or microwave links. The State Interoperability Executive Committee (SIEC)²¹ is generally responsible for interoperability and specifically responsible for interoperability and oversight of state agency networks. Because FirstNet will be a data network with cell phone calling, it will be separate from the existing voice radio networks, although, as discussed above²², it may allow agencies to use apps to interoperate to some extent with the existing land-mobile radio networks.

²⁰ Examples include CRESA (Clark County), PSERN (King County), SECOM (Benton County), SERS (Snohomish County), South Sound (Pierce County), Spokane Regional Emergency Communications System, and many others.

²¹ SIEC – <http://siec.wa.gov>

²² See the discussion on [push-to-talk here](#).

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Glossary

The Act – refers to Public Law 112-96²³, passed by Congress on February 22, 2012, which created FirstNet.

First Responder – refers to individuals and agencies who work in law enforcement, firefighting, emergency medical and as public safety answering points (PSAPs), whether government or private, and local, tribal, federal and state.

GETS – Government Emergency Telephone Services

RAN – Radio Access Network

Responder – refers to any individual or agency which sometimes responds to public safety incidents or disasters. This would include First Responders plus transportation, transit, utilities, emergency management, elected officials, and so forth

SIEC – (Washington) State Interoperability Executive Committee

WPS – Wireless Priority Service

²³ Public Law 112-96: <http://www.gpo.gov/fdsys/pkg/PLAW-112publ96/pdf/PLAW-112publ96.pdf>