

Planning Observations for MLTS/PBX E911 and the Use of PS/ALI (911 Information Manager)

Prepared by the City of Cambridge for executive and technical telecom staff in companies, universities, hotels, and other enterprises who are considering E911 MLTS solutions and/or trying to be compliant with Massachusetts new MLTS 911 regulations. No endorsement of any specific product or service is implied or intended. The intent of the document is to explicate some of the considerations and steps involved in implementing a PBX E911 solution on the City of Cambridge PBX system. This implementation will vary from an implementation in other PBX sites. It is likely that this document contains errors or omissions that are the sole responsibility of the reader (caveat emptor).

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Prologue:

What is “MLTS/PBX E911” and how does it work?

We need to get a quick idea of how 911 calling works in general before we can understand what MLTS/PBX E911 functionality is supposed to provide – and how it works.

Let’s start out our description when a person named Fred Smith calls 911 from his wired residential phone. The 911 dispatcher receiving the call sees the location of the caller’s phone on a special computerized 911 phone screen (the 911 community calls that location information “ALI” for Automatic Location Identification). The 911 Dispatcher see something like this:

(617) 868-1212 12:23 09/17/09	This is the calling phone number (called ANI) and the time/date
FRED SMITH	This is the Customer’s Name as appears on the billing record
168 MAPLE AV	This is the Street Address of Fred’s phone spelled correctly
APT 302	This is Fred’s Location information, in this case his apartment #
YOURCITY, MA	This is the City and State of his phone’s location

Note that Fred Smith did not enter any of this information about his phone. When his phone was installed by his phone company, his subscriber’s name (FRED SMITH), his service civic street address, city and state (“168 MAPLE” and “YOURCITY, MA”), and other very helpful location information (“APT 302”) automatically got entered by Fred’s phone company into a huge state-funded 911 database (the “ALI Database”) that is maintained as part of the Massachusetts state 911 system. Of special note is that the phone company has to enter and submit Fred’s street address and city name to exactly match a list of all official city/town names in Massachusetts AND not only match the spelling of every street name in every city in the state but have a street address number (e.g., 168 in the example above) that falls within a minimum and maximum range for that street in that city. The list of street names and permissible

numbers in each city and town is submitted by each town/city and is collectively called the Master Street Addressing Guide (MSAG).

Thus, when Fred calls 911 the 911 telephone switching equipment is able to lookup Fred's location information from the ALI Database - using Fred's calling phone number as the lookup key - and immediately present this information - along with his voice call - to the 911 dispatcher who is able to recognize the address because it matches the official street information for his town or city!

You can imagine that if a 911 caller is choking and cannot speak, if they are disabled and mute, if they are a child, if they cannot speak English, if they are being held against their will and are fearful of speaking, if they are a visitor and do not know their location, or if they are confused in one of a dozen ways, that this is potentially life-saving location information that is automatically presented to the 911 dispatcher and immediately relayed – mostly by radio - to fire, police, or EMS responders.

[Note that the above description of the type of civic street address information that is available with 911 calls from most all residential wired phones provided by local telephone companies is not available from cell phones nor from all "VoIP" phone service providers. In the case of cell phone 911 calls, the answering 911 dispatcher can – if available from the carrier - see the approximate latitude and longitude of the caller's phone and have it automatically appear as a dot on a 911 map display].

Now – continuing on - let us follow Fred Smith to his work location which – for the purposes of this discussion we will say is a large company with a "MLTS" or "PBX" phone system. A Multi-Line Telephone System or Priate Branch Extension telephone system consists of a computerized telephone "switch" typically managed by technical staff or vendors located in a particular room or closet and a set of dozens, hundreds, or thousands of "extension" phones located in offices, rooms, workspaces, classrooms, or other locations that are owned or rented by the company and connected by copper wires or computer cabling (or wireless means) to the central computerized PBX switch. The switch in turn is typically connected to outside "trunk" lines that run to a local telephone central office so that callers on extension phones anywhere in the company can make outside calls anywhere in the US or world.

In the case of an extension phone on a MLTS or PBX system, the location information presented to 911 Dispatchers can be much less useful – or even not useful at all - or downright misleading. Here is an example of a partial 911 call display from a PBX extension phone located in Fred Smith's work office in his LARGE BIOTECH COMPANY, INC. lab at 345 BAYSTATE DR in YOURCITY, MA without a PBX E911 solution.

(617) 868-4000 12:23 09/17/09
LARGE BIOTECH CO.
100 MAIN RD

YOURCITY, MA

This is the main PBX phone number (not Fred's!)
This is the Customer's Name as appears on their billing record
This is the Street Address of the PBX switch – not Fred's
The Location field is empty
This is the City of the PBX (not even Fred's workplace)

In the sample example above, the 911 Dispatcher has no idea where Fred is located (or worse can even be led to believe that he is at 100 MAIN RD). In this case, without a “PBX E911 solution” built into the PBX system software, the 911 dispatcher sees not Fred’s actual location but the location of his company’s PBX switch which is in another building far away from Fred. In fact, all 2,000 phones in 10 different buildings in 3 cities that are connected to this company’s PBX report the 911 call address as 100 MAIN RD. rather than the actual address.

Put another way, in the case of 911 calls from 9 of the 10 buildings used by LARGE BIOTECH COMPANY, INC., the actual street address of the caller seeking emergency help will be just plain wrong.

MTLS/PBX E911 offers a solution to Fred’s problem – and the problem of the company or institution that wishes to best provide for Fred’s safety. Let’s now pretend that Fred’s Large BioTech Co. replaces their PBX with a new VoIP PBX with an attached or inbuilt E911 solution; Fred’s 911 call now can appear like this to the 911 dispatcher:

(617) 868-4109 12:23 09/17/09	This has Fred’s actual callback number direct to Fred’s phone
LARGE BIOTECH CO.	This is still the Customer’s Name as appears on billing record
345 BATSTATE DR	This is the actual correct Street Address of Fred’s work location
FLR 3, LABS AREA	This is location of the phone in Fred’s location
YOURCITY, MA	This is the City and State of Fred’s work location

The callback number is useful and not the main PBX number, the street address is the building that Fred is actually calling 911 from, and the “FLR 3, LABS AREA” location information helps responders – as well as security personnel from the company - find Fred quickly once they enter the building.

A. Some Internal Planning Recommendations

This information is derived from the steps the City of Cambridge took to providing an inexpensive E911 solution in the new citywide PBX system it began installing in the Winter of 2009.

1. Read the new MLTS E911 rules for Mass. to see what information must be provided to 911 dispatchers – from certain PBX systems - when a person using one of your PBX extension phones calls 911. The state 911 Department MLTS rules took effect on July, 1, 2009.

The MLTS E911 regulations are at www.mass.gov/e911. For example, if PBX phones are in dormitories or hotel rooms the actual unit number of those phones must be provided. The regulations only apply to new or substantially renovated MLTS (PBX) systems installed after 7/1/09. But even “legacy” PBX systems – or – as in the case of Cambridge – newer systems installed before 7/1/09 - can implement E911 functions to help insure the safety of their employees, customers, or visitors. MLTS 911 laws are being passed in various states and will become part of a “standard of care” in the future.

2. Call your PBX reseller or switch vendor to see what their recommendations are for E911 solutions given the exact model, software release, option configuration, and setup of your current or anticipated PBX system. Be aware that the average reseller or local switch manufacturer's salesperson may not know much (or anything) about PBX E911 solutions. Ask for a person who is both knowledgeable and who has experience with doing this – hopefully in your switch environment. Some of the large switch manufacturers have E911 specialists that might be helpful: for example you could contact Mark Fletcher at Nortel (fletch@nortel.com, (972) 362-1745) or Guy Clinch at Avaya (gclinch@avaya.com, (781) 472-6055) for their suggestions.

NOTE: There are different solutions available for MLTS/PBX E911. Large systems may wish to investigate third party solutions that attach to your PBX and automatically handle many aspects of the requirements. A complete list of such solutions appears not to be available on the web, but some firms providing these products include Red Sky, E911Etc and others. Smaller systems may not need a third party more-automated-type of solution and may be able to use a 911 Service Provider's web-based product (such as PS/ALI in Mass.).

3. Given the number and location of the PBX extension phones that are or will be connected to your MLTS/PBX system, consider the type of phone location information that must or should be provided. If your PBX covers multiple buildings it should be obvious that the phones in each building must report the street address (and building name if needed to distinguish 2 buildings at the same address) for the building in which they reside. In addition, do you want to have each phone report its exact office, cube, or room location (e.g., FLR 2 ROOM 12) or can a group of phones in an contiguous area within a building report the general area or zone of each of those phones (e.g., FIFTH FLOOR NORTH END).

This latter approach uses a simplifying new concept – built into the new Massachusetts MLTS regulations - sometimes called an Emergency Response Location (ERL) and may be worth particular consideration. (Different PBX or E911 PBX solution vendors may call an ERL by another name).

An Emergency Response Location is a contiguous area within a building which easily and quickly searchable by emergency responders who are trying to find and thus aid a person who has called 911. Its exact scope and nature depends on the particular physical layout of a building or complex.

Technically, the ERL approach assigns 1 or more Direct-Inward-Dial (DID) numbers to each ERL physical zone and then those special "ERL DID's" get placed in the state 911 ALI database and stay unchanged (unless physical changes are made to your facilities). The matching or tagging of every PBX extension phone DID to its ERL DID is then simply a matter of the regular internal work of administering the setup and changes to phones on the PBX system; no PBX extension phone moves and changes need to be communicated externally to the state 911 ALI database since only the static ERL DID's need be in the state ALI database. You simply associate the correct ERL to each PBX phone in your PBX. Also, you only need to change a ERL with a phone record when that phone moves across an ERL "boundary". Finally,

depending on the type of your facility (commercial building, government agency, etc.) a ERL can be quite large and may cover a whole floor or even a whole building. But remember, the whole point is to have the ERL information presented to 911 dispatchers help police, fire, or EMS responders quickly locate a person calling 911 who herself may be incapacitated, alone, and totally depending on the E911 location information to help responders find them in time to save their life.

4. Consider various technical issues. Some are:

- a. Ensure that your PRIs or CAMA trunks can provide outbound Caller ID (and that your local service provider can accept it).
- b. Make sure, if you are using an ERL approach in whole or part, that you have enough “extra” DIDs for these ERLs. To make a simple example, if you have 2 buildings each with 2 floors and have divided each floor into a north and south ERL you will have a total of 8 ERL’s covering the 2 buildings and will need at least 16 DIDs (2 each per ERL) to enter into the state 911 database that are reserved for those ERL locations. A second DID per ERL is recommended so that more than 1 simultaneous 911 call can be placed within that ERL. If an ERL is quite large you may wish to consider more than 2 DID’s being reserved for a ERL.
- c. Consider how you will handle wireless VoIP phones, remote workers who have home office VoIP phones connected over the Internet to your PBX, etc.

B. Setting up your PBX for E911

How you enter the location of your PBX phones varies widely by manufacturer and is beyond the scope of this paper. However, if you use an ERL approach (in whole or part), you will need to understand where to enter the ERL information and then you will need to understand where you relate a specific phone DID to the ERL to which it is assigned or related.

C. Recommendations for Obtaining PS/ALI service

(if that is desired by you or needed by your system) in Massachusetts (where Verizon is not only the primary ILEC but also the 911 System Provider as of 2009-2010).

PS/ALI is a (old-but-still-used) term for a web-based Verizon product now called Information Manager (or some other name) where – among other functions - a PBX owner can manage their own PBX phone location information directly on a Verizon web site. Verizon literature says:

“PS/ALI is a generic term that encompasses:

- *Contracts or agreements which detail the telephone numbers and locations served by the PBX which will be maintained by the PBX Administrator instead of the Local Service Provider,*
- *Network provisioning to ensure CPN not BTN is delivered as ANI on 911 call*
- *PBX provisioning to ensure 9-1-1 calls route out the appropriate trunks and out pulse the correct ANI*
- *3rd party Software or services used to format the ALI record,*
- *Secure interface access to the E9-1-1 ALI database to maintain the ALI records and*
- *PS/ALI is not an automatic service option but one that must be specifically requested and provisioned.”*

As of the Fall of 2009, Verizon charged a \$2,500 one-time fee for their PS/ALI service with no recurring (monthly) charges during the 60 month term of the contract. (They used to charge a recurring fee based on the size of your PBX; they have now dropped those monthly recurring charges companywide).

1. Call your VZ account rep and say that you are interested in their PS/ALI product. Ask to be sent information about it. They may assign a sales engineer or other technical person to talk or meet with you about the product.

2. Your organization must get a NENA Company ID. NENA (the National Emergency Number Association) has created an online Company Identifier Data Base and related “Input Form” at <http://www.nena.org/nena-company-id>. You must apply for and get a NENA Company ID for your PBX system(s) before Verizon will execute your PS/ALI Contract. Note on the online input form that there will be a place where you (the NENA Company ID customer) must indicate a 24x7 Telephone Number and that should be the number for your agency (to reach someone in charge of your local MLTS system for example). There is a fee for the NENA Company ID which varies between \$200 and \$500 depending on size.

3. Your organization must get and Sign the PS/ALI Service Agreement with Verizon. Verizon literature says that this PS/ALI contract agreement can be written with their customers even where Verizon is not their dial tone provider assuming that Verizon is the local E911 Service Provider (which it currently is in Mass.).

4. Then, your organization must fill out the Login Request Form for 911 Information Manager Access. 911 Information Manager is Verizon’s new and improved web-based product for managing your PBX E911 location information in the state 911 ALI database. It is what you are getting when you sign up for PS/ALI service. Note that you have to put your NENA Company ID on this form as well.

5. 20-30 days after submitting this Request Form, the 911 Information Manager support team should/will contact the PBX administrator listed as having 9111 IM Access and help you get started. They will also send you the product manual. Then they will set up a webinar-type training session and at a

specific time you will connect and receive over-the-web training on the product. Note that you will also receive a security certificate that you will register in your web browser (e.g., IE) that allows secure and authorized access from your computer's web browser to the 911 Information Manager web site.. The City of Cambridge found this team very knowledgeable and efficient.

6. Enter your DIDs (whether station-specific or ERL or a combination) into the 911 Information Manager web site with the correct location station-specific and/or ERL-based information that you require. A tech person that supports the product can help you with the best way to approach the initial loading of your DIDs. In some cases, that tech person may enter all your DIDs for you and you can then modify the location information accordingly; this approach can be a real time saver.

Note that any street address (street name and number) that you enter for a DID must match a street entry in your city's 911 Master Street Addressing Guide (MSAG) which fortunately is also viewable in 911 Information Manager. For example, if you are entering the address of 8 DID's that represent the ERLs on 2 floors of your facility at 125 White Street in Yourcity, MA you must insure that "125 White St" is within the minimum and maximum street address range for the White St (spelled like that) in the MSAG for Yourcity. If your facilities are located in different states, you may need to discuss this with the tech support person.

7. Now make sure your PBX software is configured to include the location of station extension phones and/or ERLs and that all extension phones are matched to their ERLs. There are various other configuration settings that may also be necessary to implement an E911 PS/ALI solution on your PBX; check with your manufacturer.

8. Now you are set and need to make test calls to 911 but ONLY AFTER pre- alerting the relevant 911 center (PSAP) that you plan to make a few test calls. Be patient with them as you do not want to distract them from handling real emergencies that can happen at any time. When you make the test call(s), be sure to ask them to read the exact street address and special location information that appears with your 911 call. Is the street address appearing correctly? Does the office, floor, suite, or other location info appear as you intended? Does your company name appear correctly? And finally, is the call-back number appearing correctly (so they can call you back if the line drops) and – further – have them call back the number they see and determine whether and how it rings back to the correct phone or area.

Good luck. We hope this paper proves useful to others implementing E911 PBX solutions. Your work may well save a life.