



# MN NG911 Overview

NG 911 PSAP Informational Presentation  
5/21/2013

Jerry Christians ECN/MN DPS NG911 Project Manager

# MN NG911 Overview Agenda

1. Project Goals
2. Review of Program's Three Phases
3. Project Objectives: Implementing an IP Network to all PSAPs
4. Network Overview
5. Next Gen Components at the PSAP
6. Equipment Installation
7. Required Technicians
8. Resiliency with circuit outage
9. Measure and Monitor Network
10. FoCR (Function of Code R)
11. Migration Methodology
12. Conditional Routing Options
13. 911 Plan Change Letter
14. PSAP Installation Guide
15. Grant Process

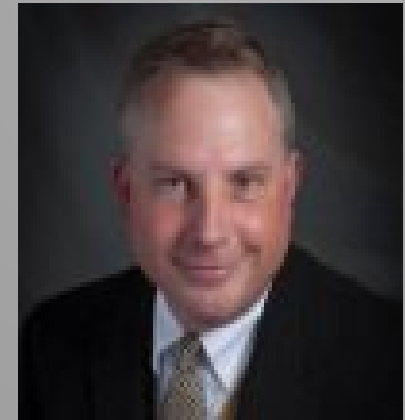
# Implementation Team



Jerry Christians  
MN 911 Project Mgr.



Dana Wahlberg  
MN ECN/DPS.



Jake Jacobson  
CenturyLink Project Mgr.



Larry Hegle  
Enterprise Visions



Thomas Richard  
Enterprise Visions

# Review of Project Goals

- ▶ Improve call transfer functionality between PSAPs
- ▶ Create an IP network that will connect all Minnesota PSAPs on a statewide Emergency Services IP Network (ESInet). This network is the foundation for Next Generation 911.
- ▶ Improve call routing. (call origination for border telephone exchanges)

# Review of Program's Three Phases

- ▶ Phase 1 completed September 27, 2010
  - Phase I provides interoperability among all Minnesota PSAPs – Any PSAP can transfer a 911 call to any other PSAP
  - An average of over 3,000 Interop Call Transfers made per month!
- ▶ Phase 2 focused on two PSAPs:
  - Carver (CenturyLink Network/Data; IES CPE) –Migrated Nov 1, 2011
  - Kandiyohi (IES Network/Data; IES CPE) – Migrated Mar 1, 2012
- ▶ Phase 3 migrating remaining MN PSAPS (102 at this time)



# Phase 2 Objectives

1. Demonstrate CenturyLink Next Gen network is a reliable alternative to the existing EM and ALI circuits.
2. Test methods and processes utilized to install and migrate a PSAP from the legacy EM trunking and ALI to NextGen emergency services IP network (ESInet).
3. Exhibit adequate maintenance support for the PSAP Gateway Modules.
4. Demonstrate ability to interface with the IES database
5. Demonstrate the network monitoring and reporting methodologies used to measure the health and performance of the network elements.
6. Identify and document the PSAP migration strategy for entire project.

# Phase 3 Objectives

1. Migrate all MN PSAPs to the IP network
  - At the end of 2012, 20 PSAPs had migrated
  - To date, a total of 48 PSAPs have migrated
2. Identify a strategy for removing Legacy Selective Routers out of the network (Phase 4 planning.)
3. Identify the requirements to connect to another Emergency Services Internet Protocol Network (ESInet)
4. Understand and document where the diversity of the network ends to each PSAP and implement a thoroughly tested NG911 solution utilizing NENA standards and open architecture.
5. “Call Origination” Implement Call Origination as PSAPs migrate to ESInet.  
Call Origination – for phone exchanges in border PSAP areas, directing call to the intended PSAP without having additional step of Call Transfer

# Program Scope

- ▶ 104 Minnesota PSAPs to NextGen Network
  - Network Scope –
    - New Network From Legacy Selective Router (LSR) to the PSAP.
    - Connect PSAPs to the ESInet
    - ALI Links will be migrated the ESInet
  - ALI Data Scope
    - ALI reporting will be reviewed to ensure there is no impact to existing metrics
  - Reporting Scope
    - New Network Reporting tools, Control Center (formerly QControl) and Clearview
    - Initial VQES MOS (Mean Opinion Score) test provided upon network and equipment Installation.



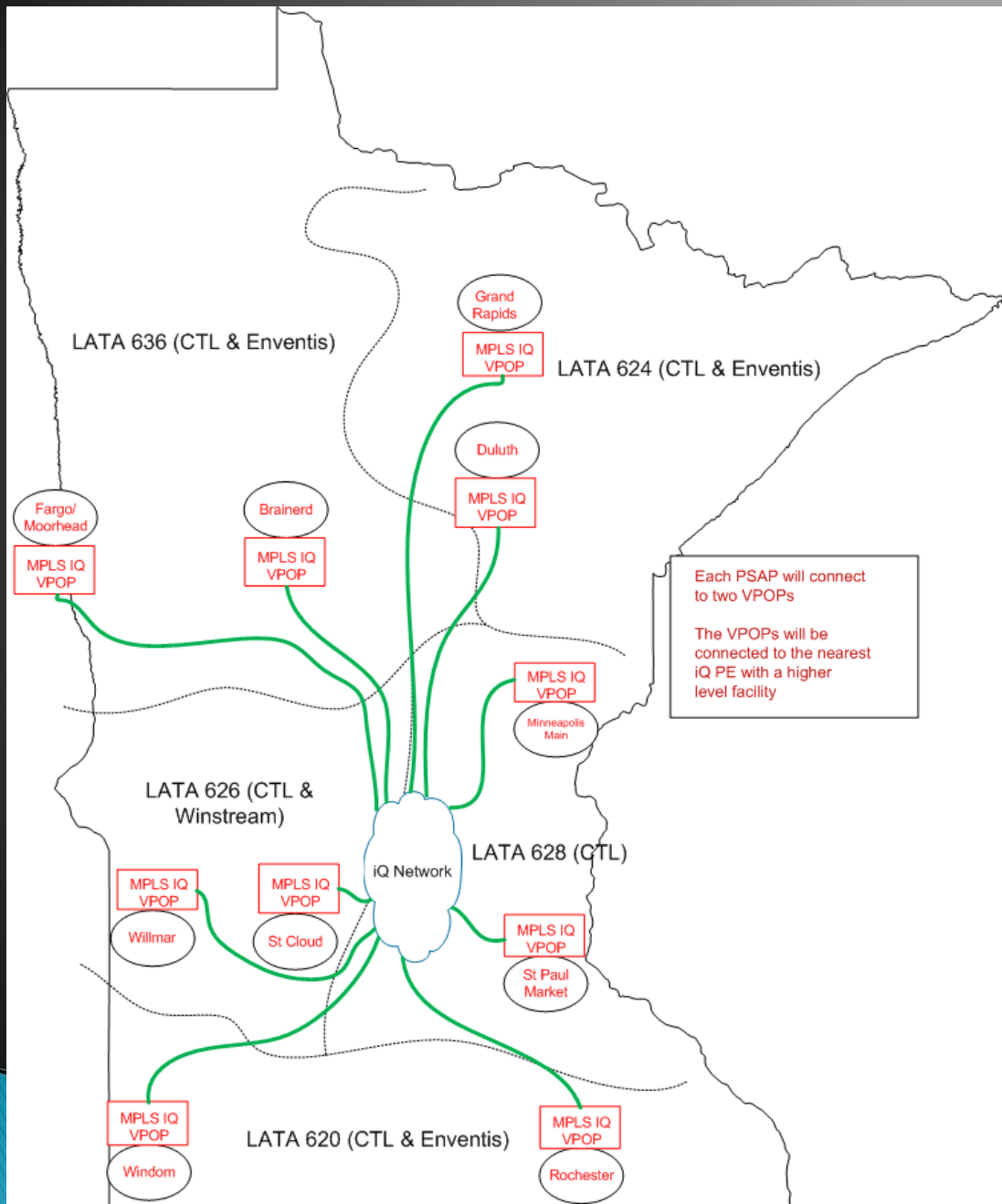
# Additional Program Scope

- Examination of how NextGen applications (GIS, Text Messaging, video feed, etc) will work with the core 911 service of Voice and ALI.
- CenturyLink's 911 system to be compatible with the State's GIS database as the source GIS data, should the State begin trialing a GIS application.
- Connecting IES ALI database to ESInet. PSAPs that formerly used IES as their ALI database service provider will continue to use IES for that function.

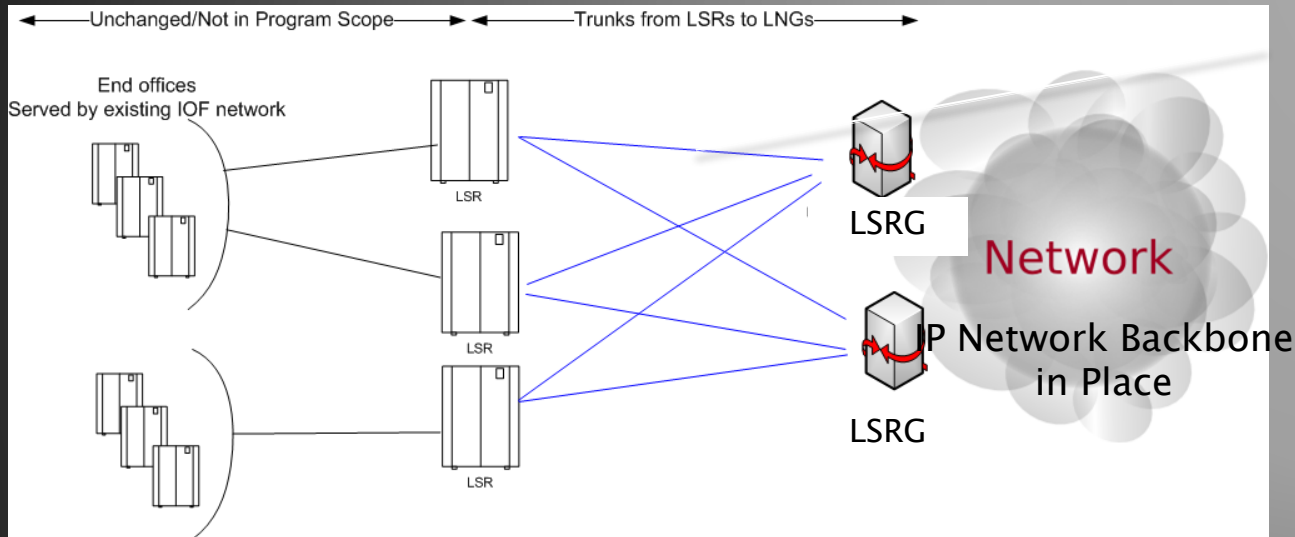
# Not in Program Scope

- ▶ Next Generation Applications, such as Text Messaging, IP Alternate Routing or GIS (though can be addressed in separate projects)

# Network Design VPOPs

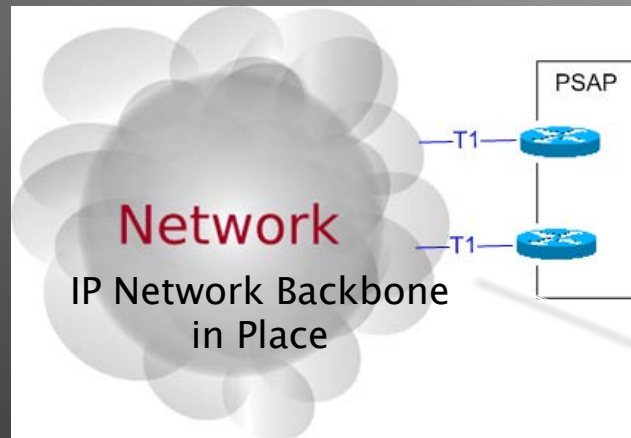


# IP Network to Provision



New Trunks  
Legacy Selective  
Routers (LSRs) to  
Legacy Selective  
Router Gateways  
(LSRGs)

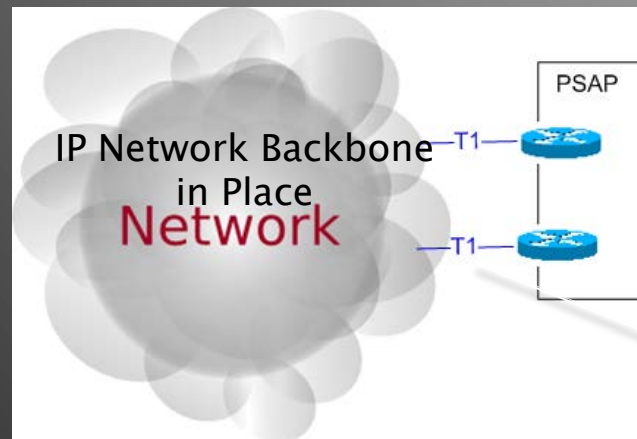
All MN PSAPS  
Interoperable in  
using universal 3  
Digit Star Codes



Diverse T1s  
to the PSAP

# IP Network to Provision continued

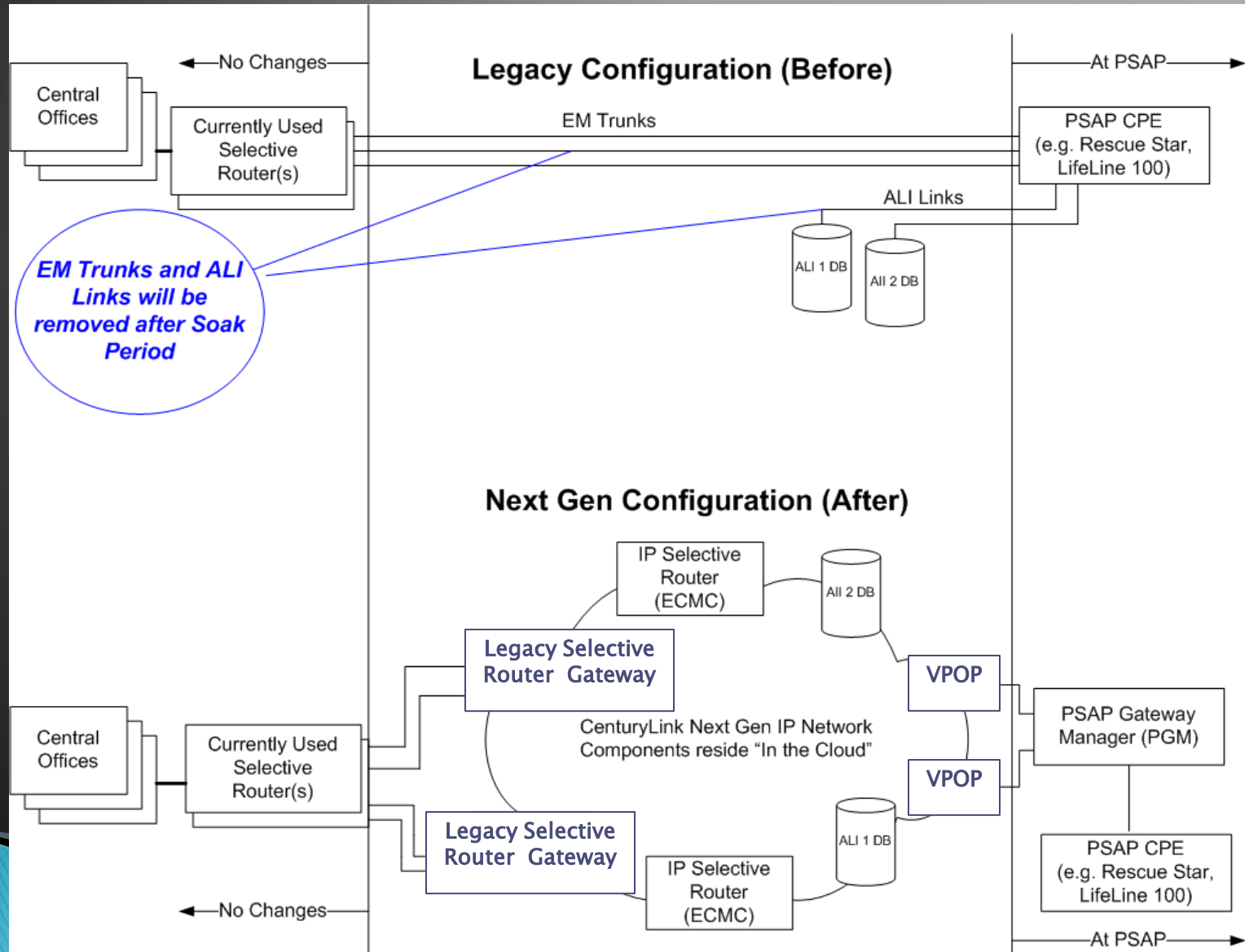
- The State and CenturyLink have engaged MNIT to utilize their network at selected PSAPs to obtain additional diversity. As of this date, MNIT has provided diversity options for 20 PSAPs



Diverse T1s  
to the PSAP



# What Will Change When Migrating to Next Generation 911



# Location of Two Legacy Selective Router Gateways for MN

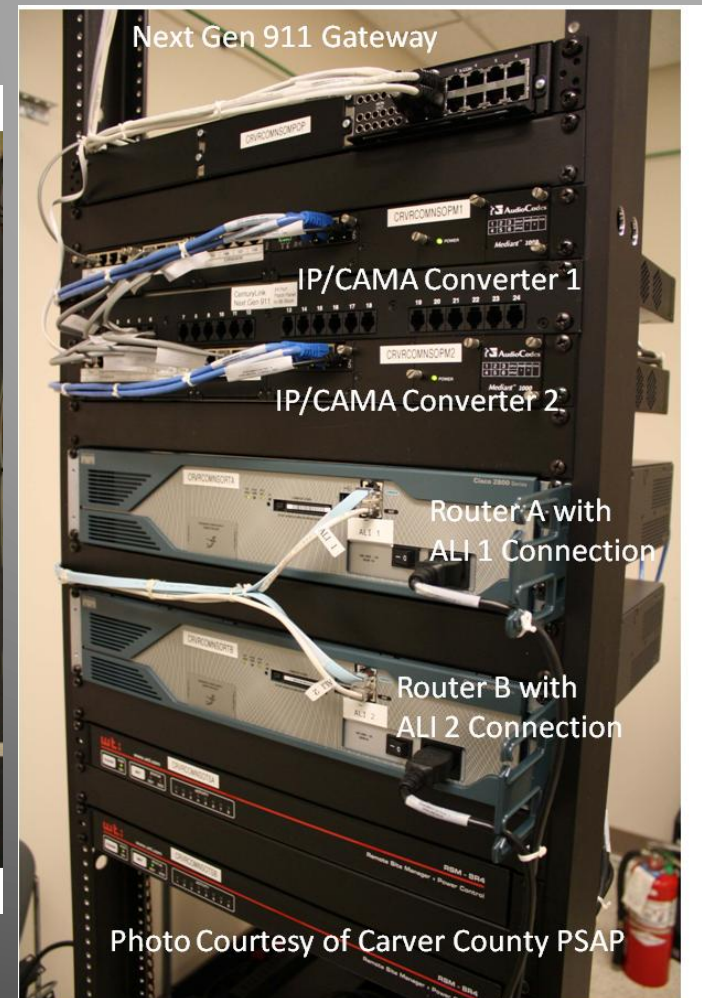
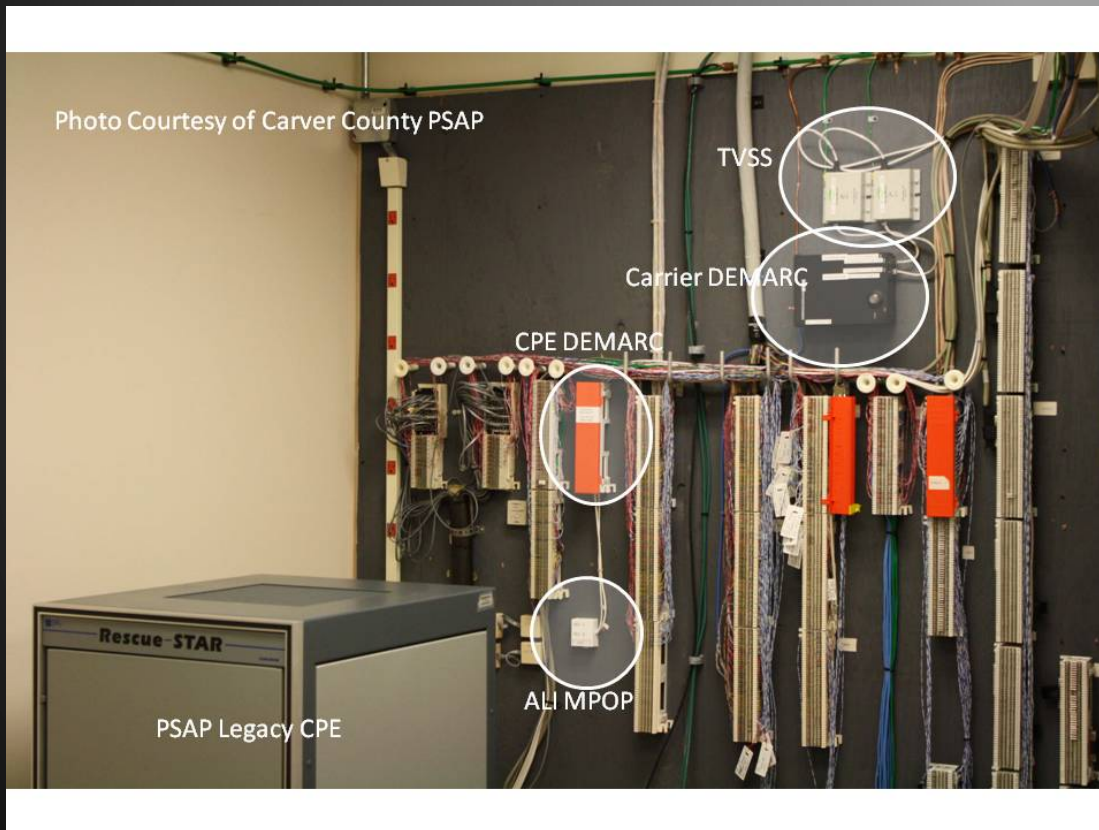
“511 Building” in Minneapolis



Atomic Data Center in Edina

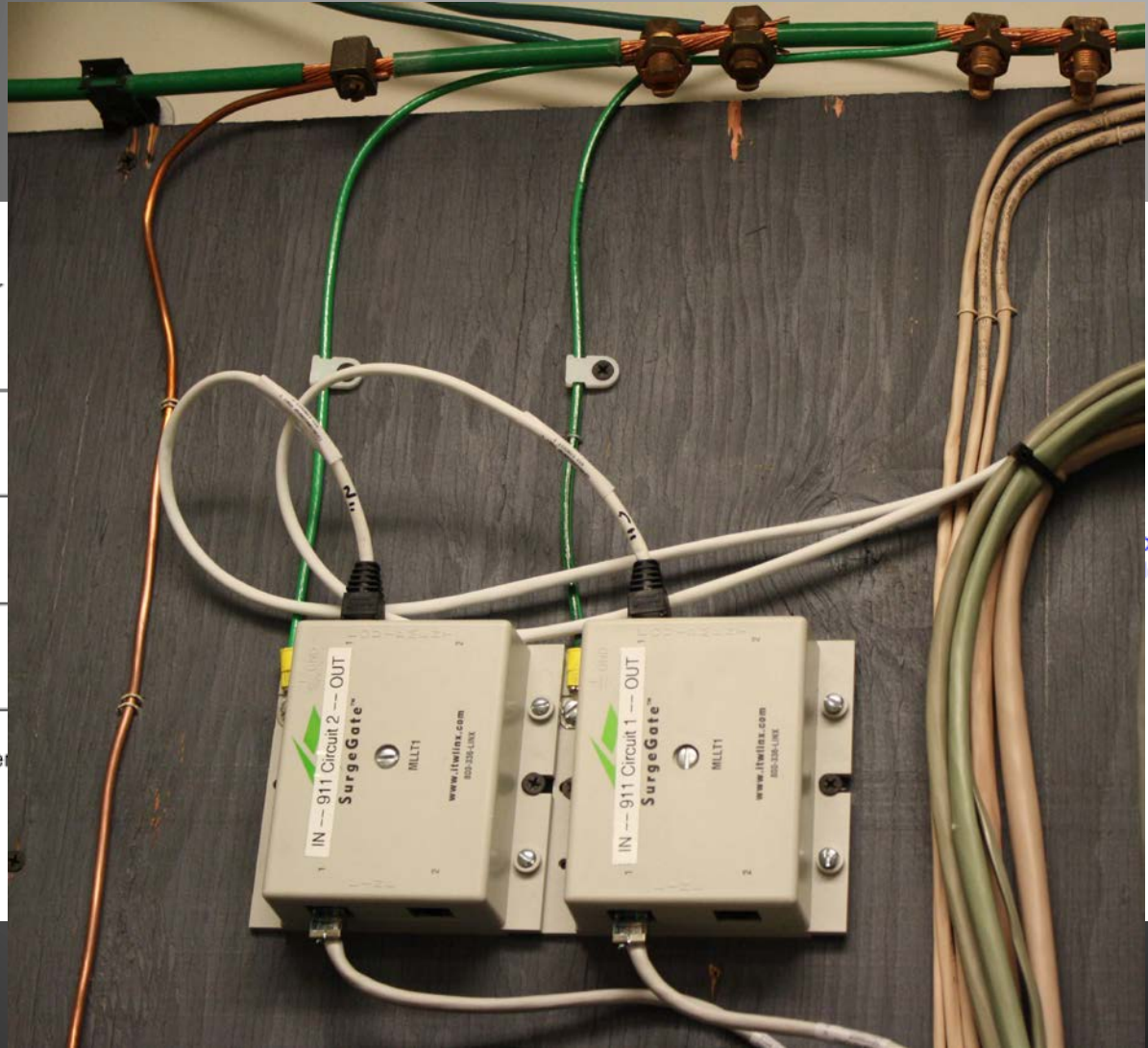
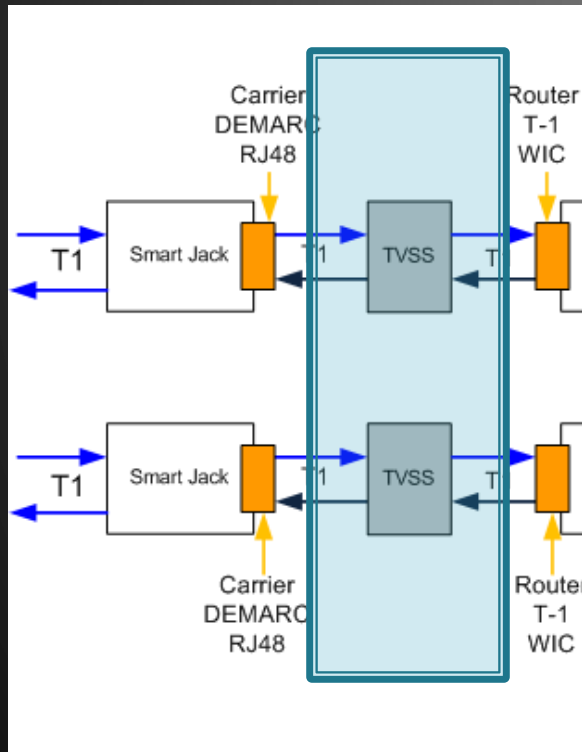


# Walkthrough of the Configuration/Equipment at the PSAP

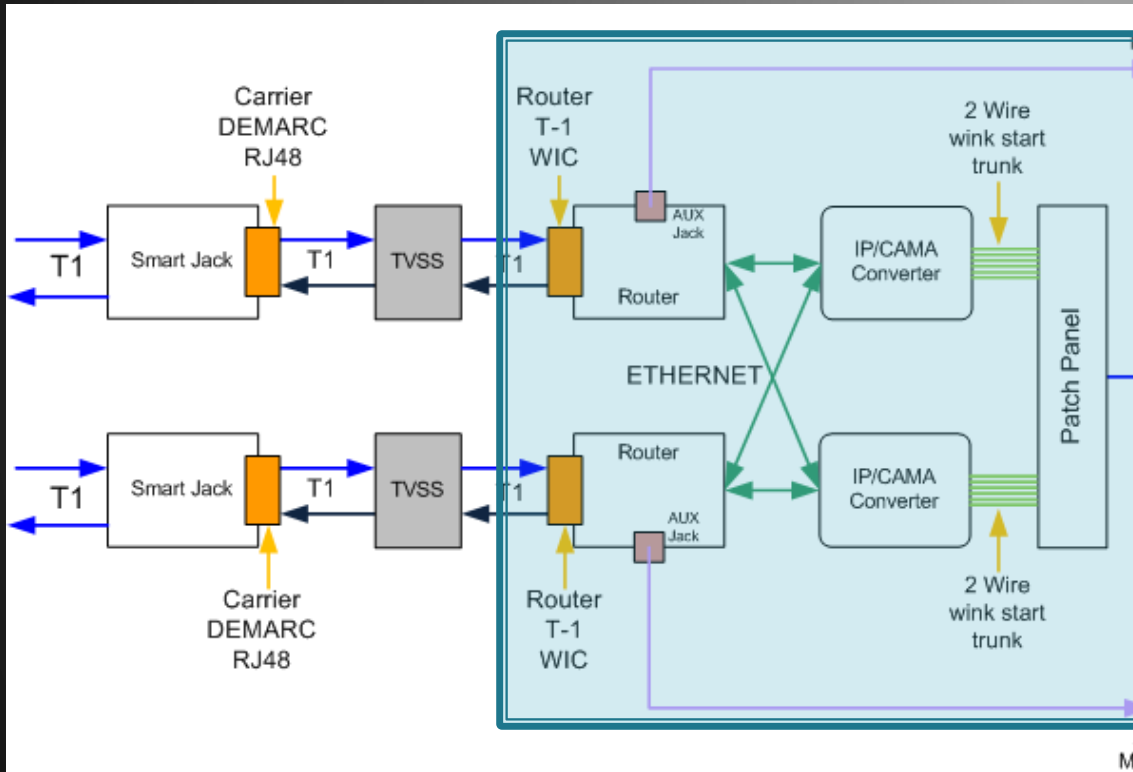




# Transient Voltage Surge Suppressors (TVSS)



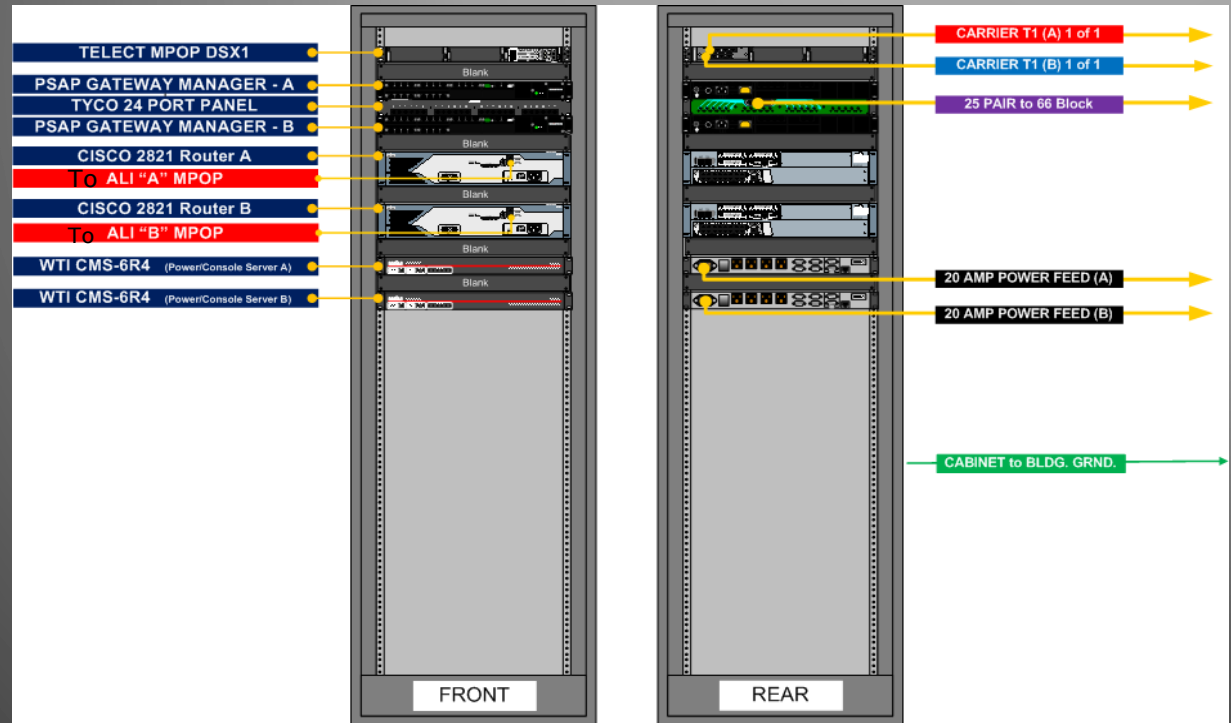
# PSAP Gateway Manager





# More on PSAP Gateway, commonly referred to as PGMs

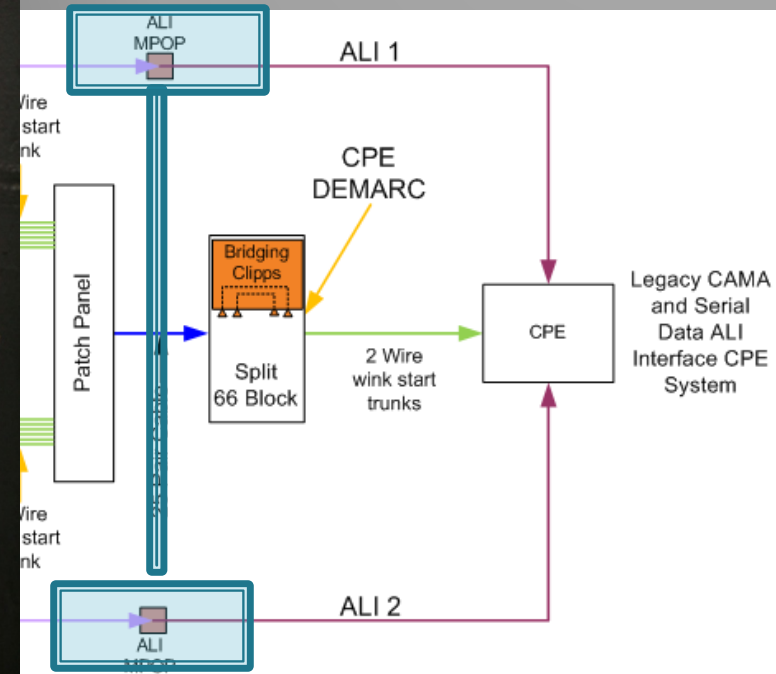
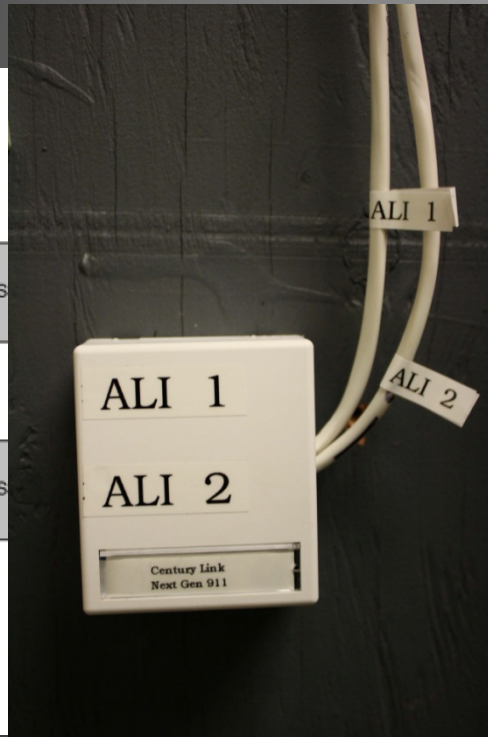
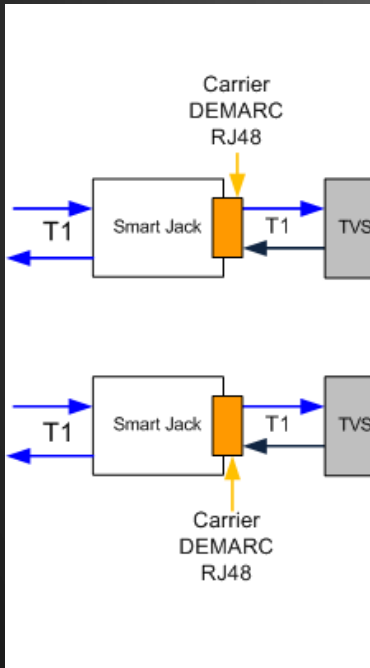
## PSAP PGMs in cabinet



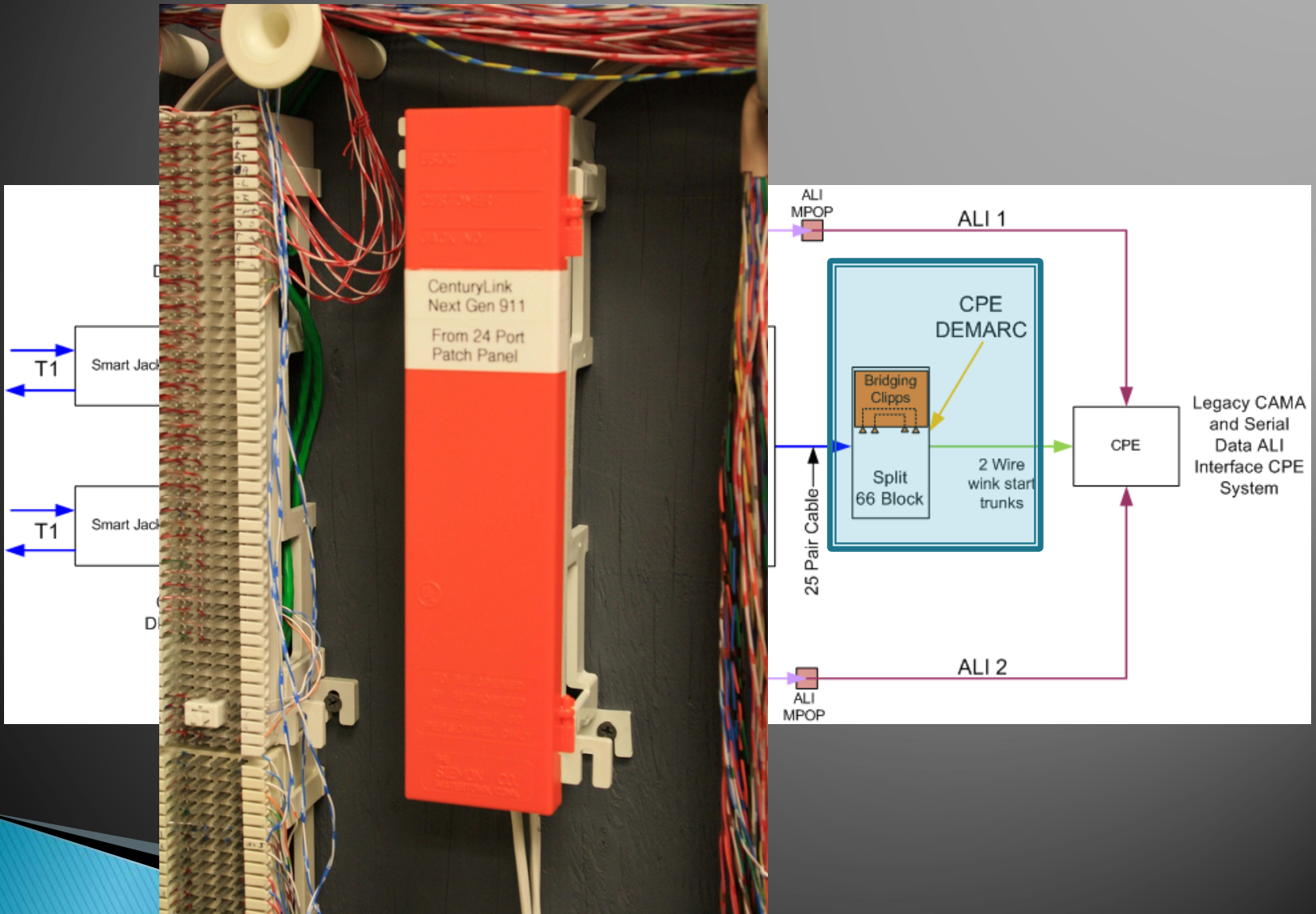
Smaller Cabinet, Rack or Wall mount options also available

Install Team brings the housing equipment with them at time of Install

# ALI MPOP



# CPE DEMARC



# PSAP Communication

## 1) ECN/MN DPS Presentation

Meetings organized by PSAPs tied to a specific Selective Router and priority of deployment

## 2) 911 Plan Change Letter

ECN MN DPS to receive a signed 911 Plan Change Letter from PSAP acknowledging its participation

## 3) Survey

PSAP will be surveyed for operational readiness (power, space, equipment housing, call logger on trunks, test line, etc)

## 4) Weekly Status Meeting

PSAP Groups – conference call weekly to discuss status – readiness, installation, pre-migration, migration

## 5) Acceptance

PSAP to acknowledge formal acceptance and move into production mode

# Install Team Process at the PSAP

## Stage 1 Site Analysis and Component Preparation

Engineering analysis of specific location site survey data

Receipt and Inventory of Network Equipment

## Stage 2 Deployment Kit Creation, Testing and Delivery

Staging and configuration of devices

Mounting the equipment in the appropriate housing (Rack/cabinet)

Build cabling harnesses; Power testing of Equipment

Kit preparation for transport and delivery

## Stage 3 On-site installation

Arrive on site as scheduled

Verification of deployment kit;

Installation of cabinet/rack deployment kit

Secure cabinet/rack and providing required bracing

Verification of Power; Connection of Network; Connection of site wiring

Testing of circuit connectivity

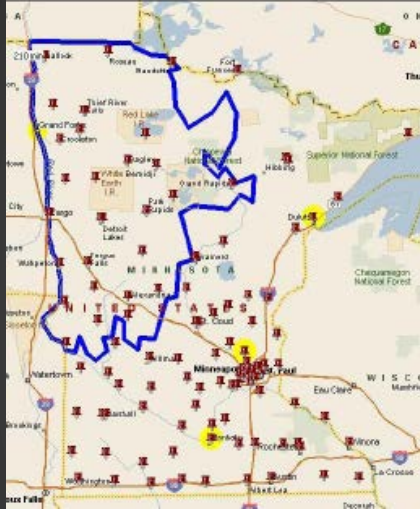
Verification of installation completion

*Install Team  
is  
Minnesota-  
based*



# Field Support

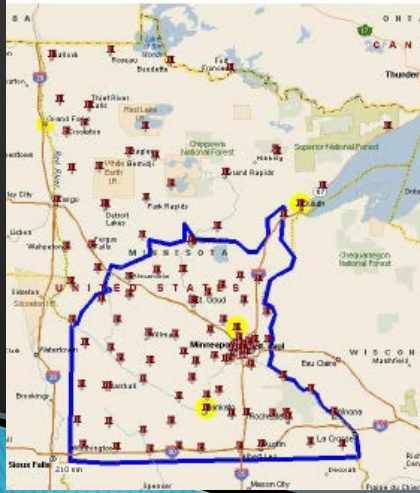
Grand Forks Depot – 4 Hour Response Coverage



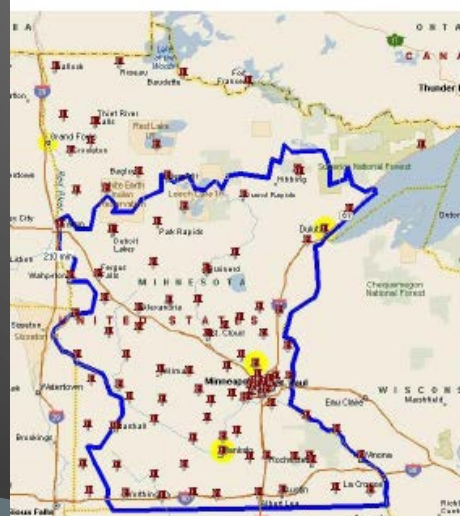
Duluth Depot – 4 Hour Response Coverage



Mankato Depot – 4 Hour Response Coverage



Minneapolis Depot – 4 Hour Response Coverage



Field Support Covers Whole State within 4 hour response Time with spare parts at 4 depots

Three of these depots cover the MESB area

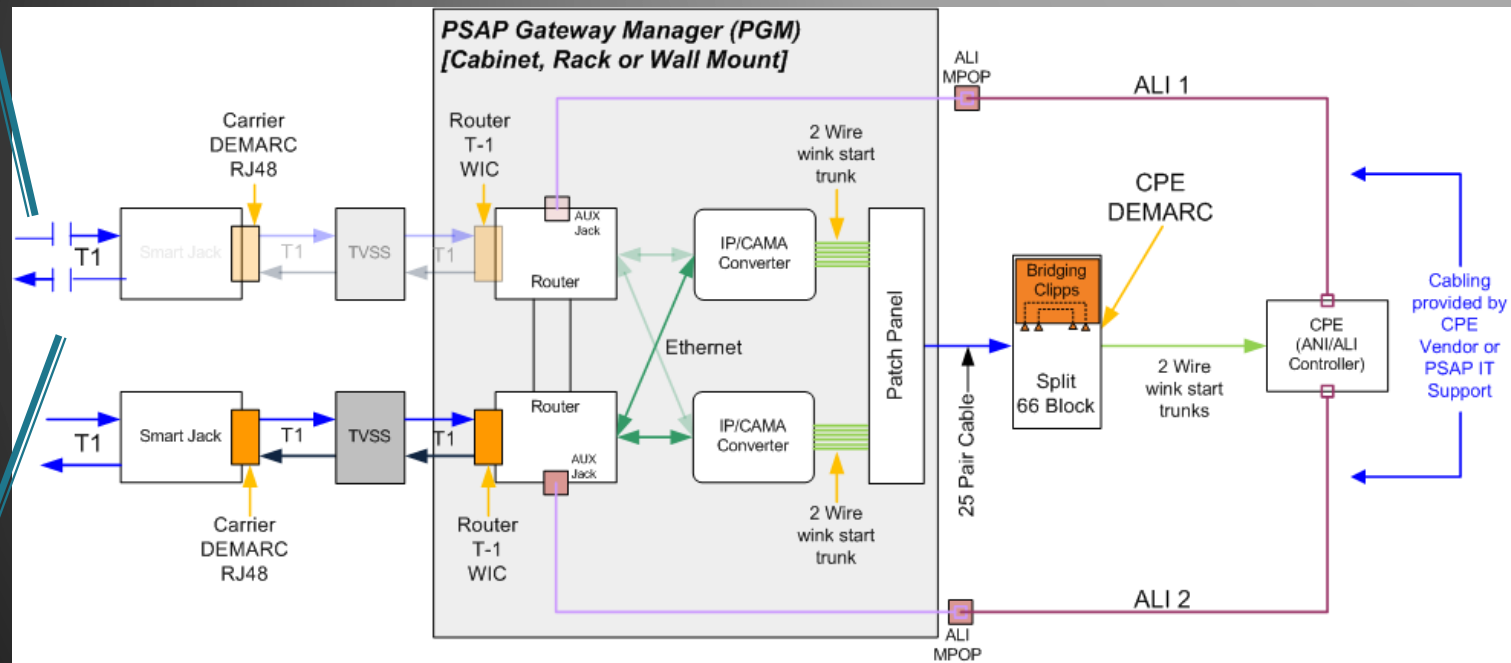
Field Support Teams also make up the Install Teams

# Technicians and Staff Needed for Premigration and Migration

- CPE Technician will be needed for Premigration to move one trunk connection to IP network for testing. This testing is done usually between 08:00am and 5pm. During this Premigration activity the ALI links will also be permanently migrated to the IP network.
- CPE Technician will be needed for Migrating all the trunks to the IP network.
- Voice logger technician will be needed during the Migration phase if trunks are being recorded. Normally following the Migration.
- PSAP personal will be required to originate test calls along with a call taker to answer the test calls to validate call data and voice quality.
- Neighboring PSAPs that will be engaged in call transfer tests will also need to be notified ahead of time for both Premigration and Migration so they are staffed adequately.
- For many IES PSAPs Premigration and Migration may be combined and activities performed during the daytime.

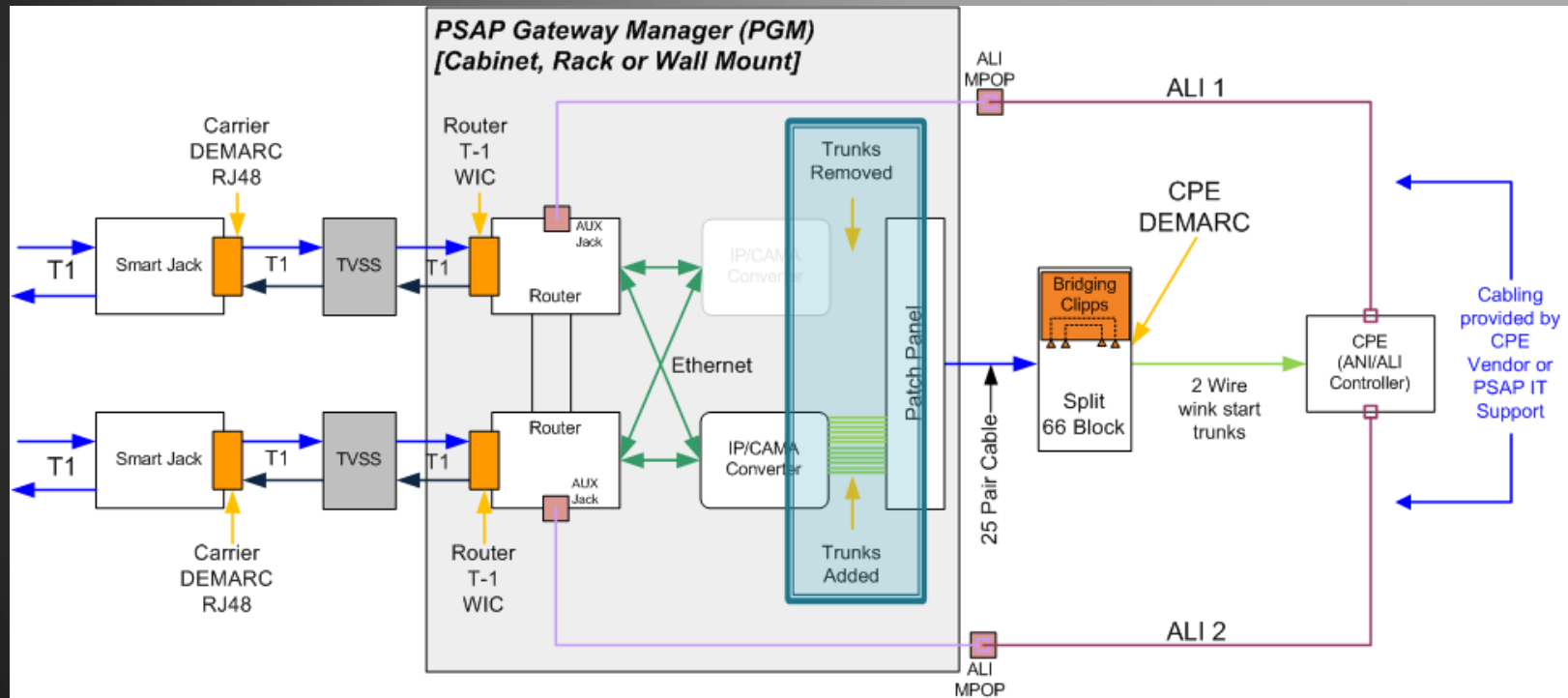
# T1 Outage Resiliency

## T1 Down



Other T1(s) configured to send all voice traffic. ALI traffic for PSAPs utilizing Intrado will also receive both ALI links

# Gateway Equipment Failure Addressed by Support Team



- Gateway Equipment will be replaced by Support team
- Support Team may move trunks initially to functioning equipment if needed for minimizing disruption.



# Measure/Monitor Mean Opinion Score (MOS)



Device at PSAP (Tektronix PP30) used for MOS Score Calculation and other quality measurements.

Centrally located Active Testing Device (Tektronix PP600) Makes and Measures Test Calls to PSAP

Example MOS readout  
(For Phase 1 Network)

MN NG911 - Phase 1	
Active Test Results 3/14-3/21/11	
Row Labels	Values
<b>Minneapolis, MN</b>	<b>4.39</b>
Ph1:511 Bldg-Denver-511 Bldg	4.39
<b>Saint Paul, MN</b>	<b>4.42</b>
Ph1:Edina Atomic-Miami-511 Bldg	4.41
Ph1:Edina Atomic-Miami-Edina Atomic	4.43
<b>Grand Total</b>	<b>4.41</b>



# Measure/Monitor


From Device: USA MI CHASKA 600 E 4TH ST : 65.233.45.154  
Selected To Device: USA CO ENGLEWOOD 391 INVERNESS PKWY : 65.233.15.6 (COLORADO\_LINK)

Select a path for active metrics

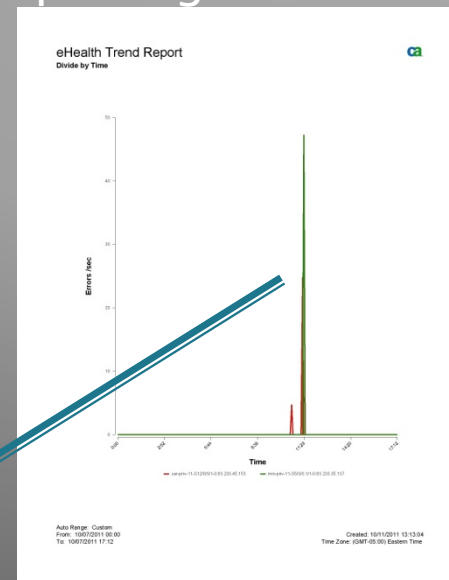
Type	From	To
E2E	XXXXXXXXXX	XXXXXXXXXX
P2P	XXXXXXXXXX	XXXXXXXXXX
P2P	CER-PRIV-11	HLR-NSSP-01
P2P	HLR-NSSP-01	XXXXXXXXXX

Select a device for passive metrics

Device	Type	Location
65.233.45.154	CE	CHASKA, MI USA
CER-PRIV-11	PE	CHICAGO, IL USA
HLR-NSSP-01	PE	HIGHLANDS RANCH, CO USA



CTL Service Manager has access to network reporting tools



Spike -when network was down at Carver for TVSS installation

*In addition, Network Operations Center has several monitoring tools For supporting Next Gen*

# Original PSAP Migration Schedule

- ▶ Order of PSAP Migration by Legacy Selective Router
- ▶ Alternate by CenturyLink and IES Routers
- ▶ Schedule to commence upon acceptance of Phase II PSAPs

# Migration of PSAPs Schedule

*Lessons Learned that altered planned schedule*

*Establishing LATA VPOPs required dependencies on multiple carriers , taking additional time than expected*

*Establishing desired diversity to the PSAP is challenging CTL develops designs of what it can offer within its own network capabilities and relationships with other carriers, this may not be sufficient.*

*Approach now:*

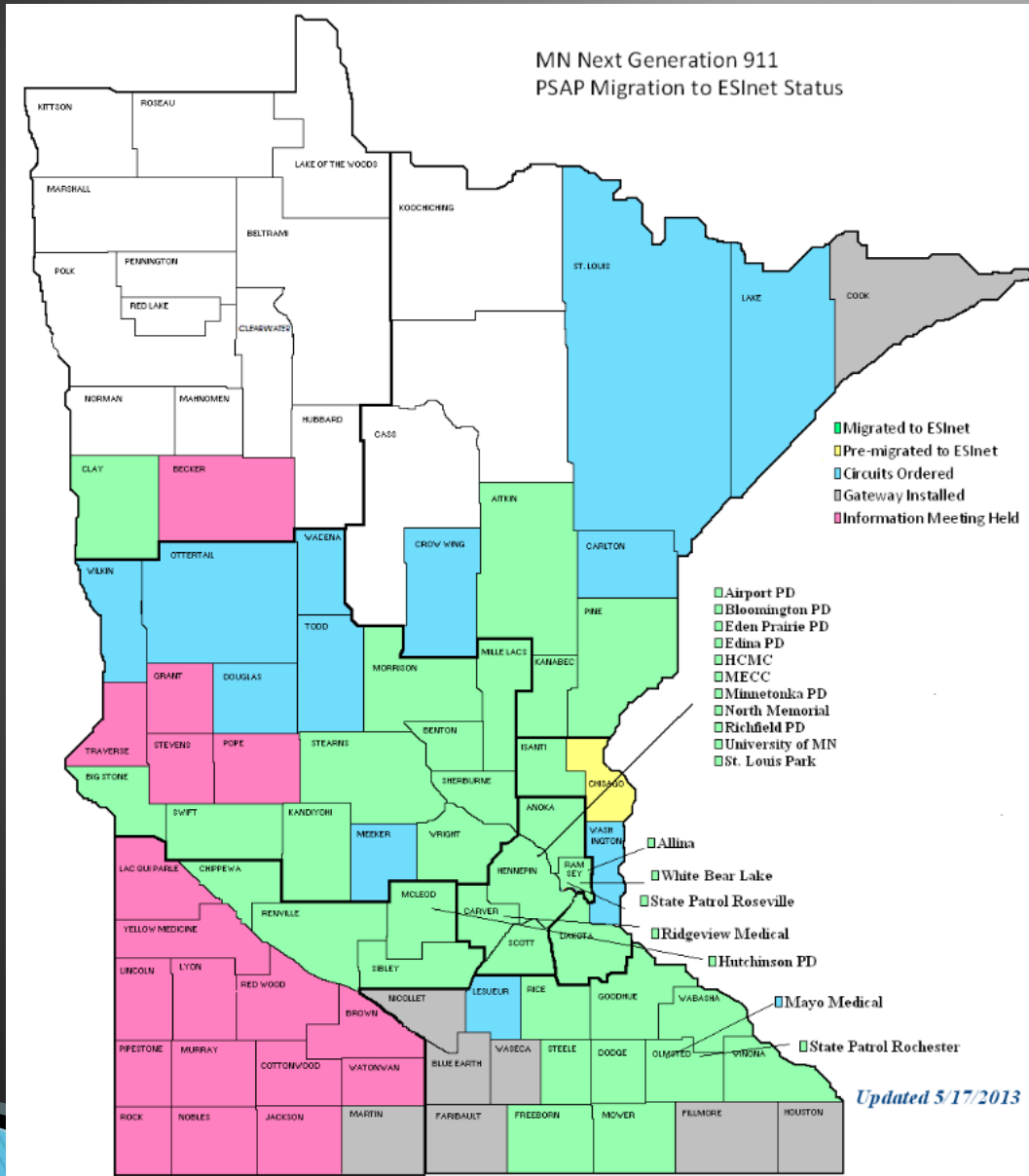
*While following the intention of “by LSR” – CTL has reached ahead to the first third of PSAPs in the order , to develop the designs so the State can assess if diversity is sufficient, and then determine what additional assistance may be required, such as engaging MNIT.*

*Design approval and subsequent provisioning will drive the schedule of migration.*

# Where we are today

<b>MN NG 911 State Wide Milestone Item</b>	<b>#</b>	<b>% of Total PSAPs (103)</b>
# of 911 Change Plan Letters Obtained	84	81.6%
# of PSAP Surveys Completed	82	79.6%
# PSAP Circuits Ordered:	71	68.9%
# of PSAPs with Circuit Design Approved	62	60.2%
# of PSAPs with Circuits Approved and Installed	60	58.3%
# of PSAPs with Equipment Installed	58	56.3%
# of PSAPs Premigrated	49	47.6%
# of PSAPs Migrated	48	46.6%

# Where we are today





# Conditional Routing

- ▶ PSAPs on the ESInet have three conditional routing options

## 1. Condition #1.

Where do 911 calls route to when all the 911 trunks are busy?

## 2. Condition #2

Where do 911 calls route to if the CPE vendor needs to take the CPE down for maintenance but all other systems are functional and the call takers are available?

## 3. Condition #3

Where do 911 calls route to when you have to abandon the PSAP?



# Conditional Routing Cont.

## ▶ Options for Condition #3 Routing

1. Call CenturyLink NOC (800-357-0911) to enable Condition#3 routing.
2. Install optional PSAP Abandonment Device (PAD). This option allows for the PSAP to enable Condition #3 abandonment routing by activation of a key that would be installed at the PSAP. There is a onetime installation charge for this option

# 911 Plan Change Letter

- ❑ PSAPs connecting to the State NG911 network will be required to submit a 911 Plan Change Letter to the State.
- ❑ The State will be providing a draft letter to the PSAPS and will be coordinating this effort.
- ❑ MESB will submit 911 Plan Change letters for all MESB PSAPs
- ❑ The signed 911 Plan Change Letters will need to be submitted to the State prior to conducting the PSAP survey.

# 911 Plan Change Letter Template

***Date***

Department of Public Safety/Emergency Communications Network  
Dana Wahlberg, 911 Program Manager  
State of MN 911 Program  
445 Minnesota Street, Suite 137  
St. Paul, MN 55101

RE: ***(Name of PSAP)*** 911 Plan Change Request

Dana:

Please accept this letter as a request to the State of MN 911 Program to make the following changes to the ***(Name of PSAP)*** 911 network. This letter represents a modification to the **(Name of PSAP)** State of MN 911 Plan, pending your approval.

***(Name of PSAP)*** 911 Plan changes requested:

- Replace CAMA EM circuits with NextGen 911 IP circuits from the CenturyLink MPLS cloud that connects to the Intrado NG911 switches in Miami, Fl. and Englewood, CO to the ***(Name of PSAP)***.
- Replace ALI circuits with NextGen 911 IP circuits from the current 911 Database provider to the ***(Name of PSAP)***.

**Associated Costs:** The costs associated with the changes above will be covered by the 911 Program. The county will not be responsible for any non-recurring installation charges for this initial deployment.

Please let me know if you need any additional documentation or have any questions. Thank you in advance for your assistance and consideration of this request.

Sincerely,

***PSAP Contact – Sheriff or Manager***  
***(Name of PSAP)***

-----  
**State of MN 911 Program Approval:** Pursuant to Minnesota Statutes 403, I approve ***(Name of PSAP)*** request to the changes described above. This letter is accepted as an interim update to the ***(Name of PSAP)*** State of MN 911 Plan.

\_\_\_\_\_  
Signed

\_\_\_\_\_  
Date

# Installation Guide

- ❑ Installation guides will be provided to the PSAPs during the PSAP survey process.
- ❑ An Installation Guide review meeting will be scheduled with the PSAP following the survey process.

# Grant Application Process

- ▶ Obtain written estimates/price quotes for work to be completed as identified by the site survey.
- ▶ Scan and send electronic copies of estimates/price quotes to Dana for approval.
  - All requests for reimbursement must be specifically related to needs to migrate to the ESInet.
- ▶ All grant contracts have been prepared and emailed to a designated PSAP grant representative.
- ▶ PSAP representative will make 3 copies of the contract, sign and return all 3 to the state.
  - All contracts should be returned ASAP if they have not been already.



# Grant Reimbursement Process

Grant contract will be signed at the state and a fully executed copy returned to the PSAP.

When all work is completed, PSAP will submit final invoices/bills along with canceled checks for proof of payment for services using the template letter provided by the state and copied on agency letterhead.

Each agency is eligible for only one reimbursement so ensure all expenses are accounted for prior to submission.

# Grant Reimbursement Process

(DATE)

Dana Wahlberg  
911 Program Manager  
Department of Public Safety  
Emergency Communication Networks  
445 Minnesota St. Suite 137  
St. Paul, MN 55101

RE: **Grant Reimbursement Request – Grant Contract Number #####**

Dana –

Per specification described in grant contract **#####**, I am requesting reimbursement in the amount of **\$(Dollar amount)** for expenses related to upgrading the equipment room in the **(NAME)** PSAP necessary to migrate to the Next Generation ESInet.

Attached are the vendor invoices supporting the amount requested, as well as cancelled checks which identify the funds have been transferred.

Kindly send the reimbursement check to:

**Agency Name**

Attn: **Name**

**Address**

**City, State Zip Code**

Thank you.

Sincerely,

**Name**

Designated Grantee Repres

5/23/2013

# Contacts

- ❑ Jerry Christians  
[jerrychristians@mcp911.com](mailto:jerrychristians@mcp911.com)  
715-644-8062 office
- ❑ Dana Wahlberg  
State 911 Program Manager  
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651-201-7546 office

# Questions ??