# Assessment of Broward County's Regional E911 Consolidated Communication Systems

***Phase I Report – Qualitative & Quantitative Findings***

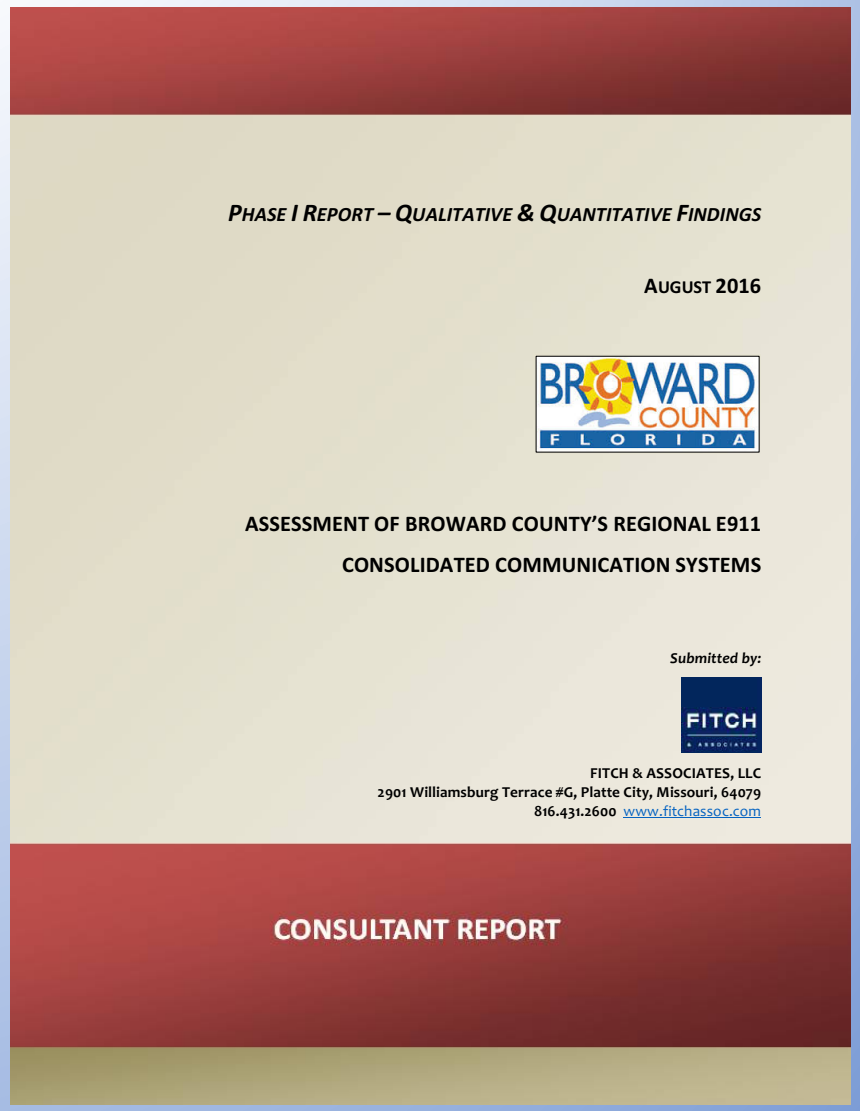
**August 2016**

FITCH
& ASSOCIATES

# Purpose & Scope

- Assess the E911 System through data collection and baseline assessments, external benchmarking, and definition of future state options.  Evaluate the System against industry best practices and opine on the pertinence and attainment of previously established goals.

- Phase I of the project and includes analyses of qualitative and quantitative data as provided by the County and other stakeholders – in essence an assessment of the current System. Phase 2 will provide a series of specific recommendations designed to improve overall System effectiveness, efficiency and utilization of industry best practices.



# Executive Summary

- The report derives its findings from two perspectives:
  - First, is the input received from stakeholders, especially Level 1 (elected, appointed and senior management officials) and Level 2 (directors, managers and supervisory personnel).
  - The second perspective is based on extensive and sophisticated analyses of raw data provided to *FITCH* consultants. The data included 911 center phone records, computer-aided dispatch (CAD) records and radio system records.

- Contrary to often cited perceptions, the System is performing – quantitatively – better than conveyed by stakeholders*:*
  - A widely discussed metric that evaluates 911 call-answering times was found to be extremely rapid, some of the quickest *FITCH* has identified in other large systems.
  - Call transfers, that happened with some regularity prior to consolidation and delayed effective system performance, has been virtually eliminated since consolidation.
  - The County's efforts to ensure quality and efficiency is support by a quality assurance and improvement program.
  - Additionally, greater operational coordination and transparency among System participants has provided qualitative improvement.

- The System has 'turned the corner' in many regards

- From a high-level policy perspective, we found three major areas that should capture the attention of stakeholders moving forward.
  - Utilization of Performance Metrics
  - Governance & Oversight
  - Technology Limitations

# Utilization of Performance Metrics

- Broward Sheriff's Office is an Accredited Center of Excellence as awarded by the International Academies of Emergency Dispatch.
- The System utilizes emergency medical dispatching (EMD) services – a best practice for 911 centers.  However, no similar program is utilized for either fire or law enforcement call types.
- The number of 911 callers required to be transferred has been essentially eliminated under the consolidated regional system, and reduced total call processing times by approximately 30 seconds.
- The County has implemented a set of quality assurance & improvement processes that assist in objectively moving the System forward

# Utilization of Performance Metrics (con't)

- Radio traffic utilization, by both fire/EMS and law enforcement units, is comparatively high. MDTs and MDCs are not effectively utilized to reduce radio traffic.
- The County's use of PASS/FAIL targets provides little in the way of information for continuous quality and performance improvement.
- Certain performance measures are a poor representation of System performance and inconsistent with current industry best practices.
- The failure of the current PASS/FAIL or YES/NO P1 busy hour target is that it provides no guidance as to the level of surge capacity that is fiscally responsible to build into the system.
- The P1 and P3 intervals can be accurately evaluated based on current data in the CAD and telephony systems. BSO performs well for these dispatch intervals. The P2 interval must be cautiously evaluated due to technology and data limitations.

# Governance & Oversight

- Low levels of trust exist among major stakeholders. Much of this is due to role definitions. Relationships need to be redefined in order for the System to move forward effectively.
- Current PSAPs, training facility and “flee to” plans have facility limitations, especially related to adequate space.
- The consolidated system is capable of closest unit response to life-threatening emergencies, but protocols are not yet in place to implement this capability.
- The County has inappropriately made, and public safety officials allowed, some operational decisions to be handled by the County that should, instead, be determined by public safety officials.
- BSO’s operation of the PSAPs are challenged with significant morale problems embedded in issues of staffing, training and management.

# Technology Limitations

- County's PSAP phone system and computer-aided dispatch (CAD) systems are not effectively linked to allow comprehensive evaluation of System performance.
- County staff is unable to directly access phone and radio system data – thereby limiting their ability to analyze system performance beyond that permitted by pre-designed reports (a 'canned' reporting system) which makes some of the required reporting tedious and error prone.
- The CAD network is redundant in the event of a failure. However, it is not tested on a regular basis. This is a current deficiency and is in conflict with best practices.
- For more than half of the incident records, the event in the CAD cannot be linked to the unique Call Detail Record (CDR) that initiated the incident.
- Employing the procedures above, FITCH found only 25.6% of CAD records valid for use in analysis of P2/P3.

# Data Analysis

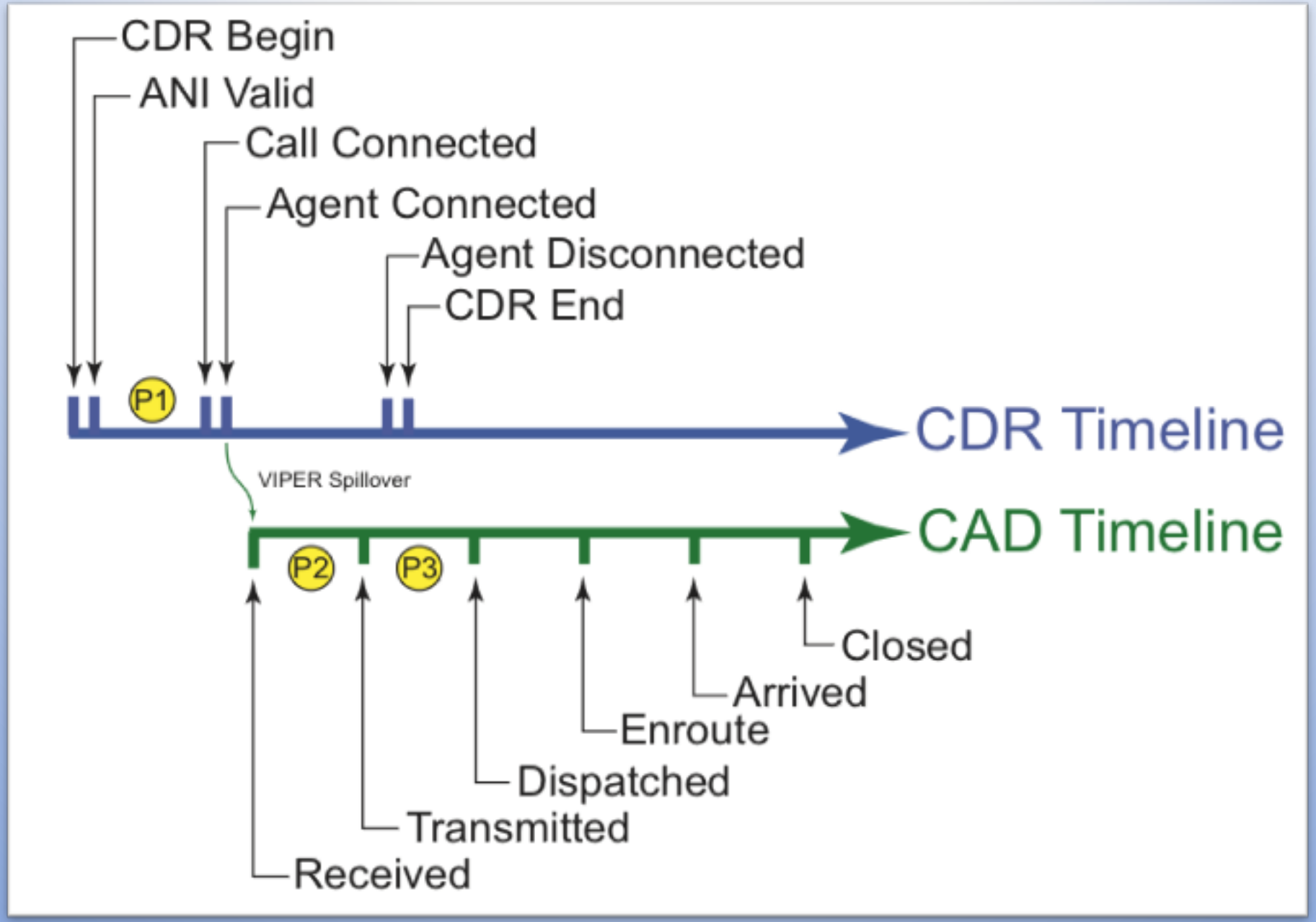
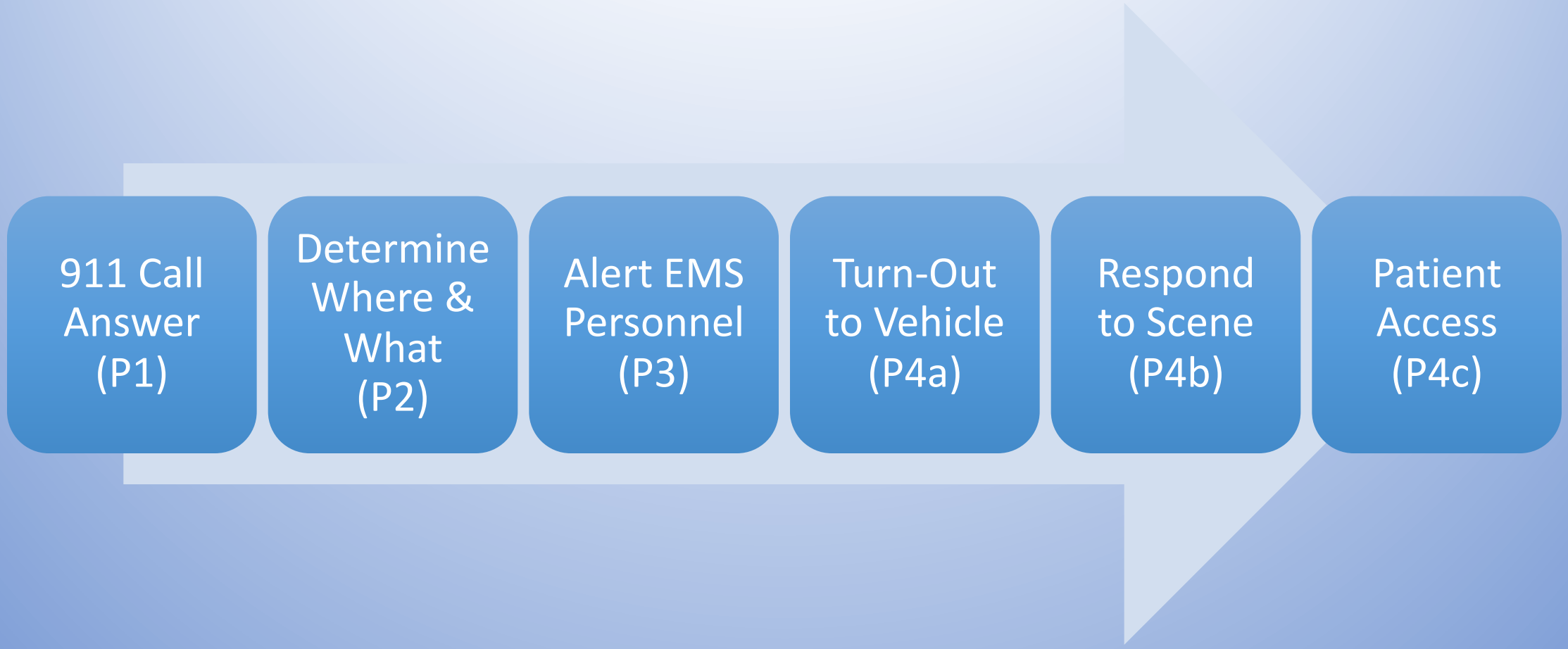

CDR Begin
ANI Valid
Call Connected
Agent Connected
Agent Disconnected
CDR End
P1
CDR Timeline
VIPER Spillover
CAD Timeline
P2
P3
Closed
Arrived
Enroute
Dispatched
Transmitted
Received

**Table 35. Validated [Received] Timestamps 11/1/2015 through 12/31/2015**

| Parameter | Count | Percentage |
|---|---|---|
| LAW Records | 136,595 | |
| With [Received] timestamps | 36,417 | 26.7% |
| With [Received] timestamps validated | 24,131 | 17.7% |
| With [Received] timestamps Out-of-Range | 890 | 0.7% |
| | | |
| FIRE Records | 43,722 | |
| With [Received] timestamps | 29,369 | 67.2% |
| With [Received] timestamps validated | 22,067 | 50.5% |
| With [Received] timestamps Out-of-Range | 235 | 0.5% |

# P1 & P2/P3

# EMS Response Time Components



# Average vs. Percentile/Fractile Compliance

- Percentile/fractile compliance is an industry standard in public safety
- Provides a higher level of assurance to the community
- Often confused with average response times –

  8:00 @ 90% = 5:00 average

If you or a loved one are having a heart attack, please select the following 'guarantee' you would like from the paramedics

We will get there within 8 minutes . . . .

A) at least half the time

B) with 90% certainty

# P1 Times

- Some of the quickest times seen in large urban 911 centers
- County decision to ‘force connect’ has proven to be very effective

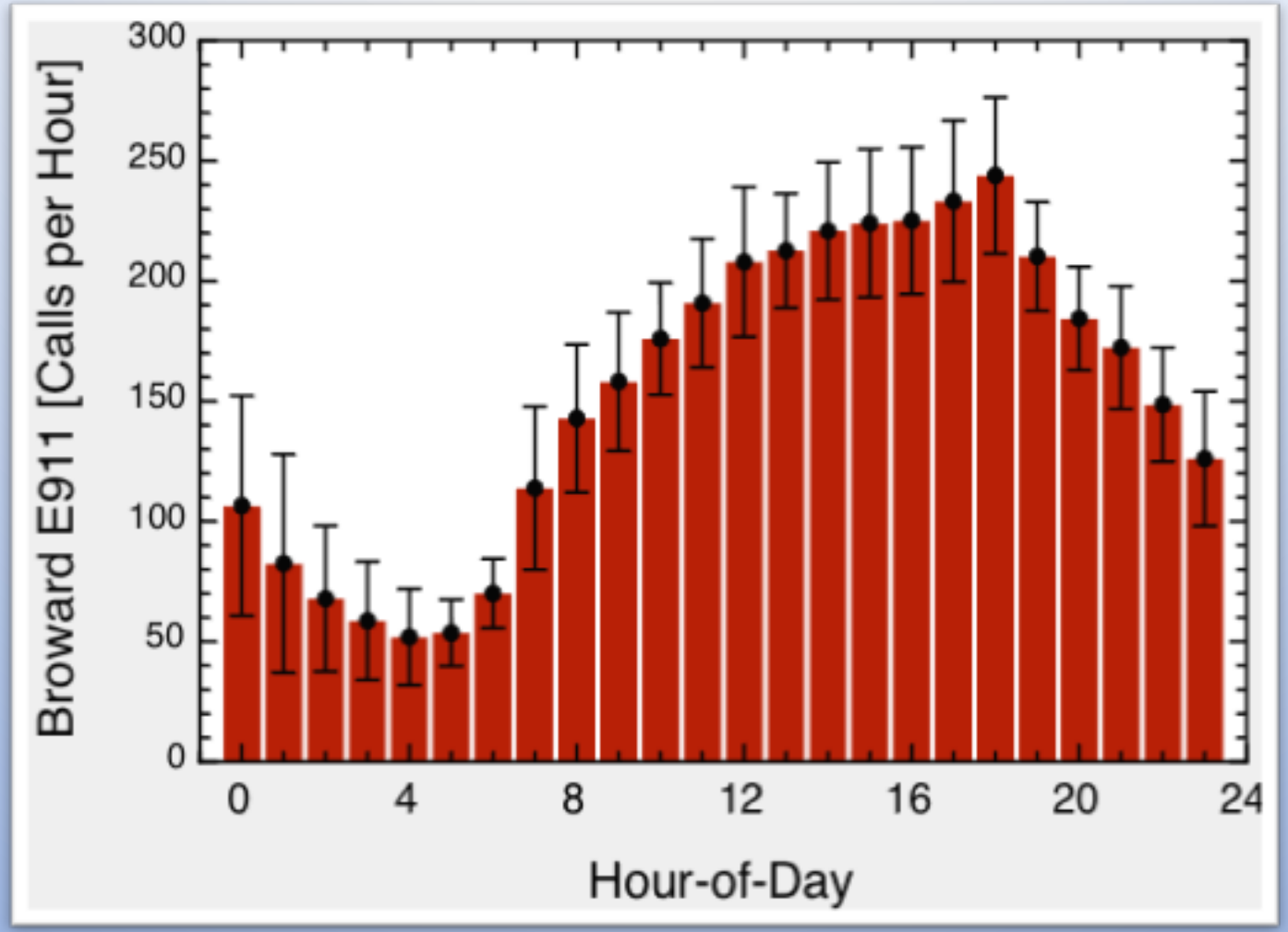
**Broward E911 Consolidated Communications System**
**Historic Answer Delays**

| Date | PSAP Location | ORCAT Assessment |
|---|---|---|
| 11/07/2015 | Central PSAP | FAIL 1600 Hours |

| Hour of Day | Phone Traffic | | | | Observed Staffing & Performance | | |
|---|---|---|---|---|---|---|---|
| | OUT | ADM | 911 | Σ Erlangs | Active WkStn's | | Ans Delay @ 90 %-tile [sec] |
| 00:00 | 11 | 17 | 81 | 3.489 | 15 | | 1.31 |
| 01:00 | 13 | 19 | 90 | 3.109 | 17 | | 1.38 |
| 02:00 | 6 | 15 | 63 | 2.486 | 15 | | 1.37 |
| 03:00 | 4 | 11 | 54 | 2.913 | 12 | | 1.31 |
| 04:00 | 11 | 8 | 60 | 2.582 | 10 | | 1.58 |
| 05:00 | 1 | 8 | 41 | 1.973 | 10 | | 1.66 |
| 06:00 | 20 | 11 | 57 | 2.829 | 12 | | 1.60 |
| 07:00 | 12 | 35 | 84 | 3.227 | 19 | | 1.37 |
| 08:00 | 26 | 34 | 118 | 3.302 | 20 | | 1.28 |
| 09:00 | 30 | 41 | 173 | 5.175 | 17 | | 1.33 |
| 10:00 | 21 | 38 | 183 | 5.612 | 19 | | 1.59 |
| 11:00 | 25 | 50 | 168 | 6.025 | 20 | | 1.43 |
| 12:00 | 29 | 54 | 166 | 7.301 | 21 | | 1.40 |
| 13:00 | 30 | 55 | 176 | 6.873 | 19 | | 1.49 |
| 14:00 | 10 | 36 | 149 | 4.932 | 21 | | 1.58 |
| 15:00 | 31 | 55 | 188 | 6.008 | 25 | | 1.50 |
| 16:00 | 22 | 46 | 188 | 6.067 | 25 | | 1.37 |
| 17:00 | 30 | 42 | 187 | 6.484 | 23 | | 1.38 |
| 18:00 | 11 | 46 | 166 | 5.655 | 23 | | 1.39 |
| 19:00 | 18 | 42 | 173 | 5.393 | 21 | | 1.41 |
| 20:00 | 10 | 38 | 121 | 4.717 | 22 | | 1.39 |
| 21:00 | 26 | 28 | 133 | 5.129 | 21 | | 1.34 |
| 22:00 | 15 | 35 | 148 | 5.301 | 22 | | 1.40 |
| 23:00 | 22 | 31 | 135 | 6.312 | 17 | | 1.31 |
| | Avg Intakes per Hour | | | Average Erlangs | Obs'd Hrs OnTask | Weighted % Immed Ans | Weighted Ans Delay |
| | OUT | ADM | 911 | | | | |
| | 18.08 | 33.13 | 129.25 | 4.704 | 446 | | 1.42 |

([CIM] Call Connected) timestasmp - ([CIM] ANI: timestamp ) = Answer Delay
Except: Answer_Delay clock stops running when caller disconnects
as indicated by ([CIM] Caller Disconnected before Supervision) timestasmp

**Figure 8. Average Busy Hour Based on Telephone Traffic**



# P2/P3 Statistics & Performance

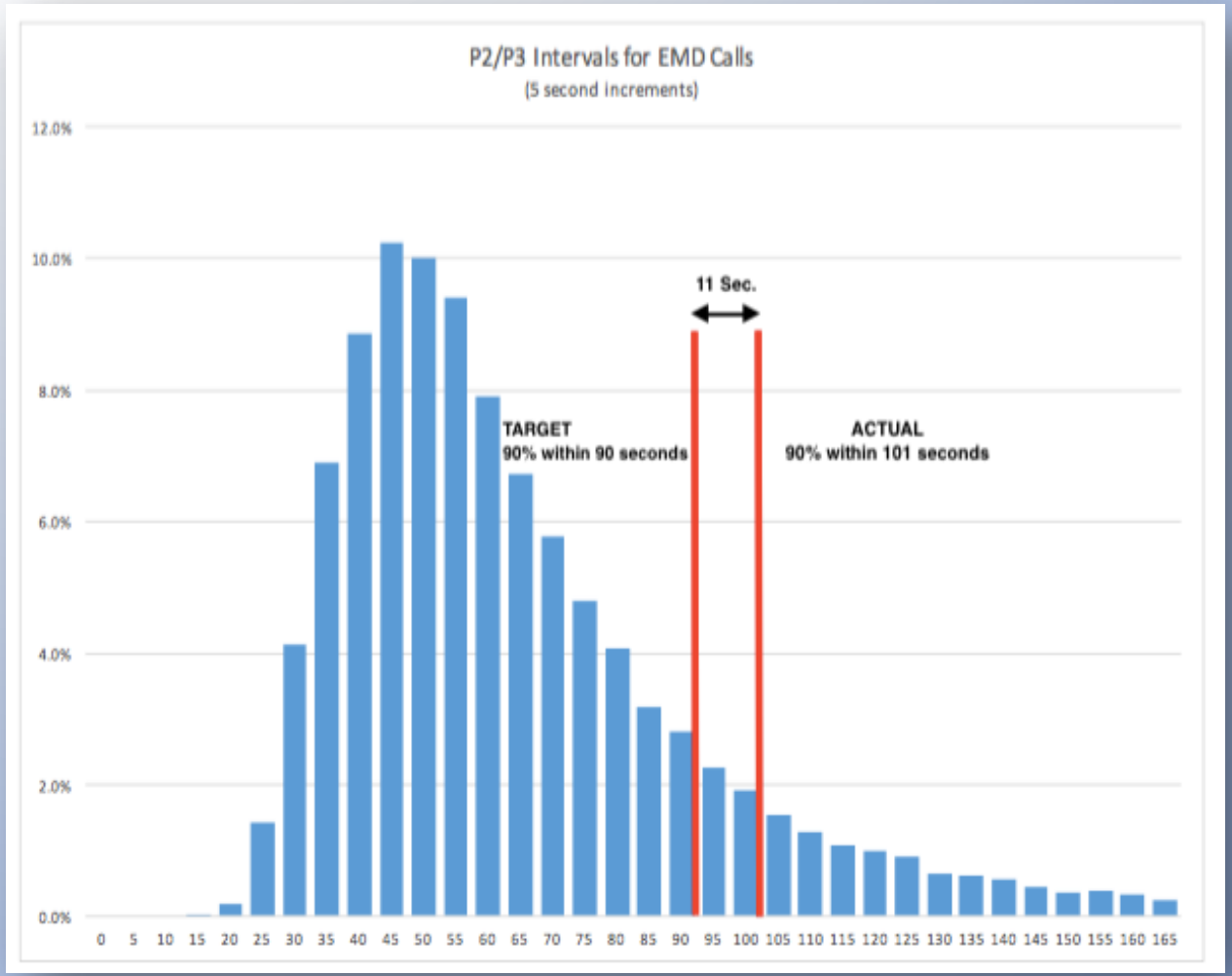
- FITCH Methodology
  - Link 911 phone record to CAD record (within 5 seconds)
  - Purposefully pending

| Parameter | Value |
|---|---|
| EMD Count | 39,214 |
| [Rcvd] absent | 11,198 |
| [Rcvd] present | 28,016 |
| [Rcvd] not validated | 7,013 |
| [Rcvd] validated | 21,003 |
| [Rcvd] validated > 165 sec | 718 |
| [Rcvd] validated < 166 sec | 20,285 |
| 50th %-tile | 54.72 sec |
| Average | 61.16 sec |
| Std Dev | ±27.47 sec |
| 90th %-tile | 100.80 sec |
| 95th %-tile | 121.33 sec |
| 99th %-tile | 157.79 sec |
| Compliance | |
| Count < 91 sec | 17,496 |
| % < 91 sec | 86.30% |
| Count < 121 sec | 19,331 |
| % <121 sec | 95.30% |

[1] The P2/P3 intervals for EMD Call Types greater than 165 seconds were assumed to be “purposefully pending” and excluded from analysis.

# P2/P3

For EMS calls, the time from call answer to dispatch should occur within 90 seconds for 90% of incidents

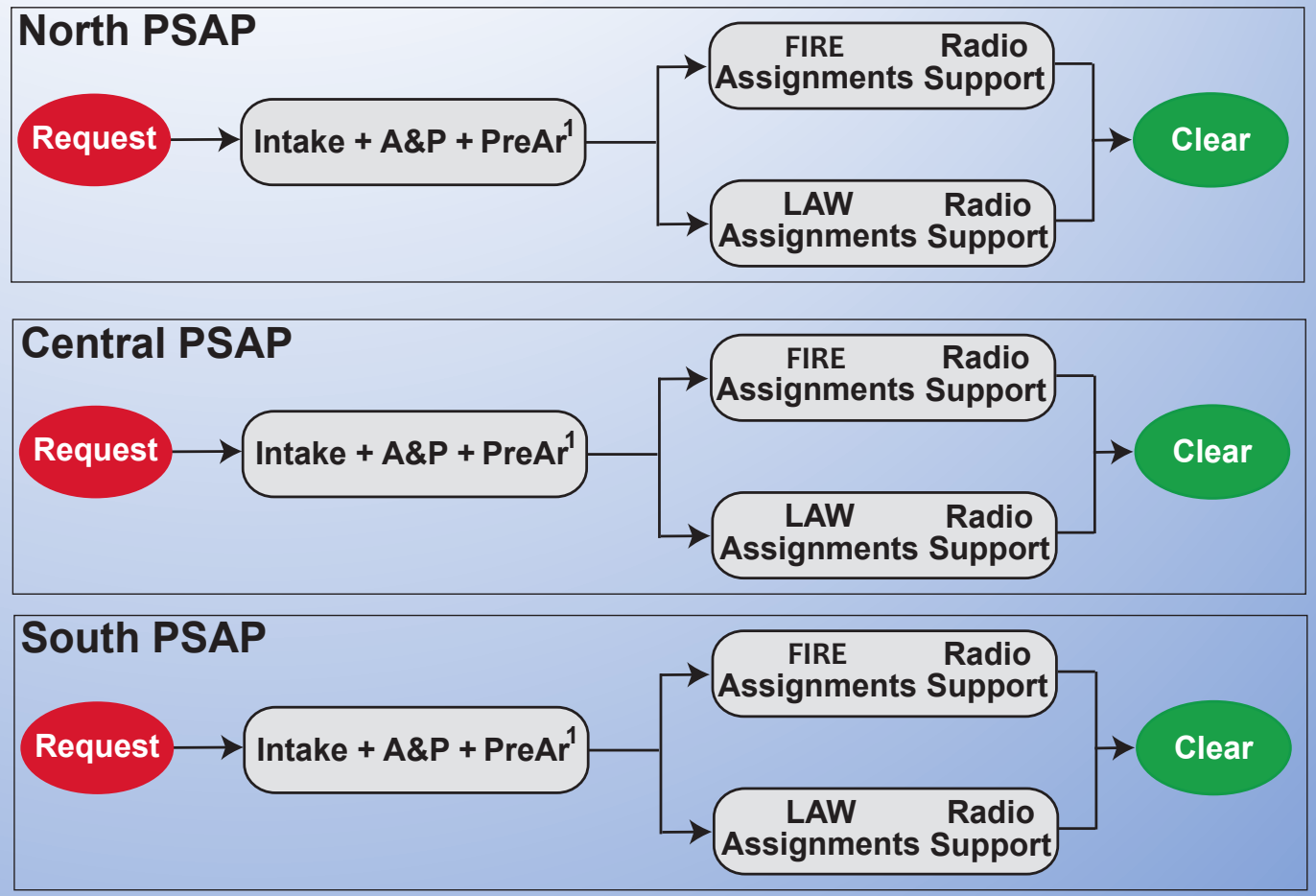


# Erlang Analysis

# Erlang

In queuing theory, workloads are measured in “Erlangs”. An Erlang is simply the ratio of the summed durations of all the activities at a type of workstation per one hour on the clock.

Erlangs and workloads are expressed as decimal hours. For example, a workload duration of 15 minutes (00:15:00 hh:mm:ss ) will appear as 0.250.




[1] Pre-Arrival Instructions only on EMS incidents with Echo-Delta determinants

# Summation Databases

**Broward E911 Consolidated Communications System**
**Phone Records by Hour of Year**

| Date | Mo | Day | Day Name | Day of Wk | Hr of Day | Hour of Yr | Record Number |
|---|---|---|---|---|---|---|---|
| 12/28/2015 | 12 | 28 | Mon | 2 | 9 | 8,674 | 1,378 |

| Central | Count | Processing Σ [sec] | 911 Ans Delay | [sec] |
|---|---|---|---|---|
| 911 Trunks | 68 | 7,246.51 | Ranked 90th %-tile | 1.27 |
| ADM / AIM | 59 | 7,313.64 | Ranked 95th %-tile | 1.42 |
| Outgoing | 16 | 633.91 | Average | 1.18 |
| Totals | 143 | 15,194.06 | ± Std Dev | 0.20 |
| Active Wkstat'n | 16 | | Predicted 90th %-tile | 1.44 |

| North | Count | Processing Σ [sec] | 911 Ans Delay | [sec] |
|---|---|---|---|---|
| 911 Trunks | 22 | 1,531.41 | Ranked 90th %-tile | 1.08 |
| ADM / AIM | 53 | 6,380.67 | Ranked 95th %-tile | 1.13 |
| Outgoing | 9 | 1,428.50 | Average | 0.92 |
| Totals | 84 | 9,340.58 | ± Std Dev | 0.33 |
| Active Wkstat'n | 10 | | Predicted 90th %-tile | 1.35 |

| South | Count | Processing Σ [sec] | 911 Ans Delay | [sec] |
|---|---|---|---|---|
| 911 Trunks | 33 | 2,680.27 | Ranked 90th %-tile | 1.45 |
| ADM / AIM | 61 | 7,674.92 | Ranked 95th %-tile | 1.62 |
| Outgoing | 17 | 1,132.05 | Average | 1.16 |
| Totals | 111 | 11,487.24 | ± Std Dev | 0.33 |
| Active Wkstat'n | 13 | | Predicted 90th %-tile | 1.59 |

| Broward County | Count | Processing Σ [sec] | 911 Ans Delay | [sec] |
|---|---|---|---|---|
| 911 Trunks | 123 | 11,458.19 | Ranked 90th %-tile | 1.33 |
| ADM / AIM | 173 | 21,369.23 | Ranked 95th %-tile | 1.62 |
| Outgoing | 42 | 3,194.46 | Average | 1.13 |
| Totals | 338 | 36,021.88 | ± Std Dev | 0.28 |
| Active Wkstat'n | 39 | | Predicted 90th %-tile | 1.49 |

**Broward E911 Consolidated Communications System**
**CAD Records by Hour of Year**

| Date | Mo | Day | Day Name | Day of Wk | Hr of Day | Hour of Yr | Record Number |
|---|---|---|---|---|---|---|---|
| 01/01/2015 | 1 | 1 | Thu | 5 | 23 | 24 | 24 |

| Central PSAP | CAD Count | Assgn WorkId [sec] | Xmit/Rcv's Count | Radio WorkId [sec] |
|---|---|---|---|---|
| Law | 40 | 3,415 | 432.63 | 3,880.87 |
| Fire | 11 | 100 | 117.84 | 999.42 |

| North PSAP | CAD Count | Assgn WorkId [sec] | Xmit/Rcv's Count | Radio WorkId [sec] |
|---|---|---|---|---|
| Law | 19 | 757 | 217.70 | 1,982.38 |
| Fire | 6 | 74 | 70.86 | 579.65 |

| South PSAP | CAD Count | Assgn WorkId [sec] | Xmit/Rcv's Count | Radio WorkId [sec] |
|---|---|---|---|---|
| Law | 20 | 1,044 | 223.48 | 2,023.87 |
| Fire | 7 | 68 | 83.52 | 732.99 |

| Broward County | CAD Count | Assgn WorkId [sec] | Xmit/Rcv's Count | Radio WorkId [sec] |
|---|---|---|---|---|
| Law | 79 | 5,215 | 873.81 | 7,887.12 |
| Fire | 24 | 242 | 272.22 | 2,312.06 |

The next step in the modeling process was to create two Summation databases, each one with 8,760 records, one record for each hour of the year. The purpose of the Summation databases was to serve as a repository for data that had been aggregated by hour-of-year.

# Averaged Databases

**Broward E911 Consolidated Communications System**
**Call Details by Hour of Day**

| Hr of Day |
|---|
| 9 |

| Central | Count | | Processing | |
|---|---|---|---|---|
| | avg | ± std dev | avg | ± std dev |
| 911 Trunks | 90.86 | 45.52 | 9,064.63 | 4,232.12 |
| ADM / AIM | 35.49 | 18.93 | 4,293.97 | 2,494.09 |
| Outgoing | 18.63 | 10.35 | 872.81 | 607.96 |
| Totals | 144.97 | 68.88 | 14,231.41 | 6,301.04 |
| Intake WrkStn | 15.58 | 4.29 | | |

| North | Count | | Processing | |
|---|---|---|---|---|
| | avg | ± std dev | avg | ± std dev |
| 911 Trunks | 29.74 | 15.78 | 2,906.29 | 1,438.21 |
| ADM / AIM | 36.25 | 19.76 | 4,840.51 | 2,671.11 |
| Outgoing | 8.75 | 5.96 | 431.27 | 495.86 |
| Totals | 74.74 | 36.03 | 8,178.06 | 3,720.07 |
| Intake WrkStn | 10.89 | 2.56 | | |

| South | Count | | Processing | |
|---|---|---|---|---|
| | avg | ± std dev | avg | ± std dev |
| 911 Trunks | 32.81 | 22.02 | 3,567.31 | 2,336.74 |
| ADM / AIM | 32.33 | 22.23 | 4,311.92 | 3,022.00 |
| Outgoing | 11.50 | 8.13 | 501.05 | 440.85 |
| Totals | 76.63 | 46.61 | 8,380.28 | 5,125.83 |
| Intake WrkStn | 10.87 | 3.83 | | |

| Broward County | Count | | Processing | |
|---|---|---|---|---|
| | avg | ± std dev | avg | ± std dev |
| 911 Trunks | 153.40 | 69.31 | 15,538.23 | 6,082.26 |
| ADM / AIM | 104.07 | 54.81 | 13,446.39 | 7,255.71 |
| Outgoing | 38.87 | 19.67 | 1,805.13 | 1,044.79 |
| Totals | 296.34 | 134.66 | 30,789.75 | 12,983.64 |
| Intake WrkStn | 36.00 | 9.01 | | |

**Broward E911 Consolidated Communications System**
**CAD Records by Hour of Day**

| Hr of Day |
|---|
| 23 |

| Central PSAP | | CAD Count | Assgn Workld [sec] | Xmit/Rcv's Count | Radio Workld [sec] |
|---|---|---|---|---|---|
| Law | avg | 37.00 | 2,677.75 | 353.00 | 3,159.42 |
| | ± sd | 8.84 | 824.76 | 94.64 | 844.43 |
| Fire | avg | 11.96 | 147.51 | 130.68 | 1,100.30 |
| | ± sd | 3.67 | 73.72 | 40.23 | 338.91 |

| North PSAP | | CAD Count | Assgn Workld [sec] | Xmit/Rcv's Count | Radio Workld [sec] |
|---|---|---|---|---|---|
| Law | avg | 18.02 | 1,030.33 | 204.19 | 1,859.55 |
| | ± sd | 5.77 | 478.77 | 65.05 | 592.38 |
| Fire | avg | 5.40 | 78.74 | 64.05 | 517.07 |
| | ± sd | 2.59 | 55.53 | 30.73 | 247.98 |

| South PSAP | | CAD Count | Assgn Workld [sec] | Xmit/Rcv's Count | Radio Workld [sec] |
|---|---|---|---|---|---|
| Law | avg | 28.82 | 1,498.91 | 266.46 | 2,629.78 |
| | ± sd | 8.36 | 639.70 | 77.70 | 761.26 |
| Fire | avg | 7.10 | 91.21 | 86.25 | 767.82 |
| | ± sd | 2.71 | 48.78 | 33.03 | 294.21 |

| Broward County | | CAD Count | Assgn Workld [sec] | Xmit/Rcv's Count | Radio Workld [sec] |
|---|---|---|---|---|---|
| Law | avg | 83.85 | 5,206.99 | 823.65 | 7,648.75 |
| | ± sd | 19.21 | 1,565.22 | 193.43 | 1,793.53 |
| Fire | avg | 24.47 | 317.45 | 280.99 | 2,385.19 |
| | ± sd | 5.82 | 116.30 | 66.95 | 567.58 |

Averaged databases, each containing 24 records, one record for each hour-day. The Summation databases were queried by hour-of-day. Each activity in that hour-of-day was averaged over all the days of the year, and the results written into the corresponding record in the Averaged database.

# Fire Rescue Radio

**Broward E911 Consolidated Communications System**
**Workstation Performance by Hour-of-Day**

| Year | Dispatch Model | Workstation Name | Surge |
|---|---|---|---|
| 2015 | Triple PSAP | Central Assign FIRE | + 0.00 σ |

| Surge | Hour of Day | Hourly Averages | | | | Workstation Staffing & Performance | | |
|---|---|---|---|---|---|---|---|---|
| | | FIRE | LAW | Radio | Σ Erlangs | OnTask | Immediate Answer [ % ] | Ans Delay @ 95 %-tile [sec] |
| | 00:00 | 9.96 | | 108.57 | 0.287 | 5 | 100.00 | 0.00 |
| | 01:00 | 8.84 | | 96.56 | 0.255 | 5 | 100.00 | 0.00 |
| | 02:00 | 8.05 | | 87.74 | 0.232 | 5 | 100.00 | 0.00 |
| | 03:00 | 7.44 | | 81.15 | 0.214 | 5 | 100.00 | 0.00 |
| | 04:00 | 6.93 | | 75.51 | 0.199 | 5 | 100.00 | 0.00 |
| | 05:00 | 7.32 | | 79.99 | 0.211 | 5 | 100.00 | 0.00 |
| | 06:00 | 8.69 | | 94.39 | 0.252 | 5 | 100.00 | 0.00 |
| | 07:00 | 11.85 | | 129.07 | 0.342 | 5 | 100.00 | 0.00 |
| | 08:00 | 15.00 | | 163.64 | 0.436 | 5 | 99.99 | 0.00 |
| | 09:00 | 17.14 | | 186.62 | 0.497 | 5 | 99.98 | 0.00 |
| | 10:00 | 18.79 | | 204.97 | 0.547 | 5 | 99.97 | 0.00 |
| | 11:00 | 18.73 | | 204.29 | 0.546 | 5 | 99.97 | 0.00 |
| | 12:00 | 19.01 | | 207.54 | 0.555 | 5 | 99.97 | 0.00 |
| | 13:00 | 18.68 | | 203.84 | 0.546 | 5 | 99.97 | 0.00 |
| | 14:00 | 18.55 | | 202.36 | 0.544 | 5 | 99.97 | 0.00 |
| | 15:00 | 19.14 | | 208.99 | 0.568 | 5 | 99.97 | 0.00 |
| | 16:00 | 18.37 | | 200.30 | 0.543 | 5 | 99.97 | 0.00 |
| | 17:00 | 18.72 | | 204.37 | 0.555 | 5 | 99.97 | 0.00 |
| | 18:00 | 18.57 | | 202.47 | 0.550 | 5 | 99.97 | 0.00 |
| | 19:00 | 16.96 | | 185.08 | 0.502 | 5 | 99.98 | 0.00 |
| | 20:00 | 16.31 | | 178.08 | 0.479 | 5 | 99.98 | 0.00 |
| | 21:00 | 15.45 | | 168.45 | 0.454 | 5 | 99.99 | 0.00 |
| | 22:00 | 13.93 | | 152.07 | 0.408 | 5 | 99.99 | 0.00 |
| | 23:00 | 11.96 | | 130.68 | 0.347 | 5 | 100.00 | 0.00 |

| Hourly Averages | | | Average Erlangs | Req'd Hrs OnTask | Weighted % Immed Ans | Weighted Ans Delay |
|---|---|---|---|---|---|---|
| FIRE | LAW | Radio | | | | |
| 14.35 | 0.00 | 156.53 | 0.419 | 120 | 99.98 | 0.00 |

Central FIRE Assignment workstations staffed to BSO specs as documented in PSAP CALL ANALYSIS NOVEMBER 2015.xls

**Broward E911 Consolidated Communications System**
**Workstation Performance by Hour-of-Day**

| Year | Dispatch Model | Workstation Name | Surge |
|---|---|---|---|
| 2015 | Triple PSAP | Central Assign FIRE | + 0.00 σ |

| Surge | Hour of Day | Hourly Averages | | | | Workstation Staffing & Performance | | |
|---|---|---|---|---|---|---|---|---|
| | | FIRE | LAW | Radio | Σ Erlangs | OnTask | Immediate Answer [ % ] | Ans Delay @ 95 %-tile [sec] |
| | 00:00 | 9.96 | | 108.57 | 0.287 | 1 | 71.28 | 10.22 |
| | 01:00 | 8.84 | | 96.56 | 0.255 | 1 | 74.55 | 8.63 |
| | 02:00 | 8.05 | | 87.74 | 0.232 | 1 | 76.80 | 7.66 |
| | 03:00 | 7.44 | | 81.15 | 0.214 | 1 | 78.60 | 6.88 |
| | 04:00 | 6.93 | | 75.51 | 0.199 | 1 | 80.15 | 6.24 |
| | 05:00 | 7.32 | | 79.99 | 0.211 | 1 | 78.86 | 6.79 |
| | 06:00 | 8.69 | | 94.39 | 0.252 | 1 | 74.78 | 8.63 |
| | 07:00 | 11.85 | | 129.07 | 0.342 | 2 | 95.23 | 0.73 |
| | 08:00 | 15.00 | | 163.64 | 0.436 | 2 | 92.77 | 1.18 |
| | 09:00 | 17.14 | | 186.62 | 0.497 | 2 | 90.99 | 1.53 |
| | 10:00 | 18.79 | | 204.97 | 0.547 | 2 | 89.50 | 1.85 |
| | 11:00 | 18.73 | | 204.29 | 0.546 | 2 | 89.52 | 1.85 |
| | 12:00 | 19.01 | | 207.54 | 0.555 | 2 | 89.25 | 1.90 |
| | 13:00 | 18.68 | | 203.84 | 0.546 | 2 | 89.51 | 1.85 |
| | 14:00 | 18.55 | | 202.36 | 0.544 | 2 | 89.59 | 1.84 |
| | 15:00 | 19.14 | | 208.99 | 0.568 | 2 | 88.85 | 2.03 |
| | 16:00 | 18.37 | | 200.30 | 0.543 | 2 | 89.62 | 1.85 |
| | 17:00 | 18.72 | | 204.37 | 0.555 | 2 | 89.25 | 1.94 |
| | 18:00 | 18.57 | | 202.47 | 0.550 | 2 | 89.41 | 1.90 |
| | 19:00 | 16.96 | | 185.08 | 0.502 | 2 | 90.85 | 1.59 |
| | 20:00 | 16.31 | | 178.08 | 0.479 | 2 | 91.52 | 1.44 |
| | 21:00 | 15.45 | | 168.45 | 0.454 | 2 | 92.26 | 1.29 |
| | 22:00 | 13.93 | | 152.07 | 0.408 | 2 | 93.53 | 1.05 |
| | 23:00 | 11.96 | | 130.68 | 0.347 | 1 | 65.34 | 13.48 |

| Hourly Averages | | | Average Erlangs | Req'd Hrs OnTask | Weighted % Immed Ans | Weighted Ans Delay |
|---|---|---|---|---|---|---|
| FIRE | LAW | Radio | | | | |
| 14.35 | 0.00 | 156.53 | 0.419 | 40 | 87.24 | 3.12 |

Central FIRE Assignment workstations staffed to FITCH specifications

(no surge capacity)

# Improve System Effectiveness & Efficiency

- BSO current performance indicates overstaffing in Call taker positions based on Erlang modeling.
- BSO current performance indicates overstaffing in FIRE Assignment positions based on Erlang modeling

# Erlang Output

- To achieve a certain level of performance, what resources are required.

- The output from Phase 2 will model the required **filled** positions required:
  - By position (call taker; law; fire), and
  - By hour of day

# Next Steps

- Meet w/ stakeholders to review Phase 1 findings
- Review & discuss various alternatives
- Finalize recommendations
- Integrate recommendations under Phase 2 into a Final Report

# Questions