NFIRS 5 Alive

Quality Improvement Dashboard

Overview

Many fire, police & EMS organizations have strategic plans and strategic analytics. The problem is annual plans and annual evaluations do not address inefficiencies in hour-to-hour operations. Operational performance remains unchanged despite the time spent on planning documents.

To bridge the gap between strategic plans and real-world operations Animated Data, Inc. is introducing the *QI Dashboard*. This web-based display will be deployed in ***NFIRS 5 Alive*** for fire agencies. It will also be offered as a hosted web service with tactical and operational analytics for fire, police and EMS agencies requiring hourly performance assessments.

Putting the Pieces Together

NFIRS 5 Alive provides thousands of strategic reports that can be quickly and easily created on demand. By adding the *QI Dashboard* tactical reports will be automatically generated daily. Operational reports will be generated hourly.

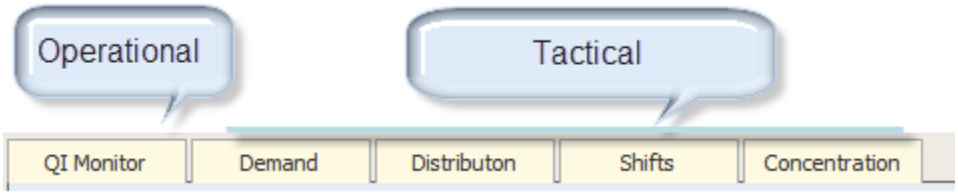
Any web browser may be used to view the new tactical and operational reports. The *QI Dashboard* operates equally well from a file folder or from a web server allowing flexible deployment and full security control.

Breaking it down

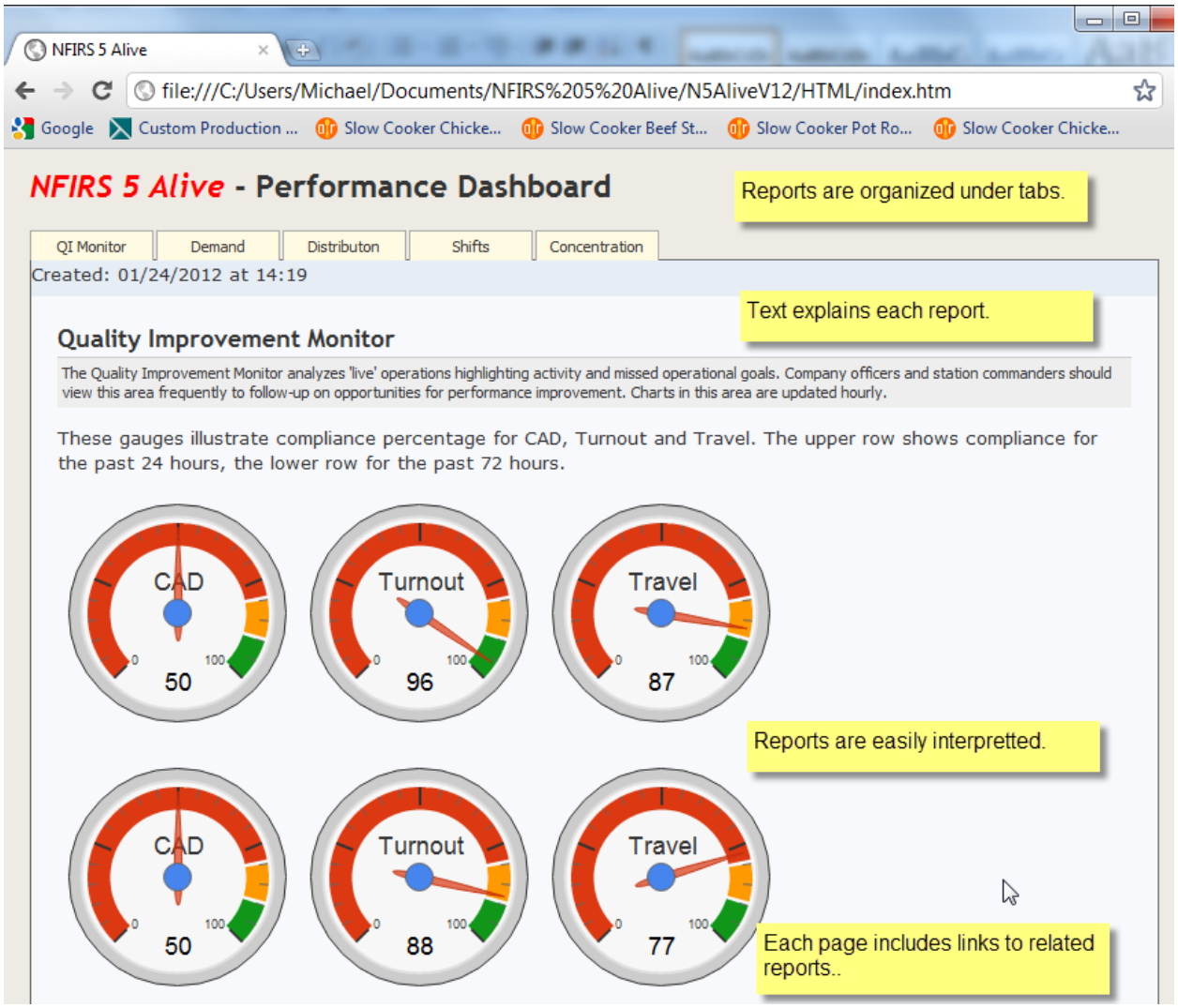
Strategic Analytics	Tactical Analytics	Operational Analytics
NFIRS 5 Alive **Jurisdictional Profile** • Demand • Distribution • Shifts • Concentration **Time Analyzer** **Staff Analyzer**	**NFIRS 5 Alive** **QI Dashboard** Trend Analysis (daily rates for 7, 30 & 90 days) • Demand • Distribution • Shifts • Concentration	**NFIRS 5 Alive** **QI Dashboard** (24 & 72 Hour Analysis) • Data Quality Monitor • Demand • Distribution • Missed Goal Notifications
Reports on Demand	Automatic Reporting Daily	Automatic Reporting Hourly
Senior Staff / Accreditation Team	Station Commanders, Battalion Chiefs	Company Officers and Line Personnel
Review and Modify Policies	Update Operational Procedures	Monitor and Correct Performance in Real Time

Introducing the QI Dashboard

The QI Dashboard consists of the QI Monitor for operational analysis as well as “Demand”, “Distribution”, “Shifts” and “Concentration” pages for tactical analysis. The QI Monitor updates hourly while the Tactical pages update daily.



The dashboard opens on the first page of the QI Monitor.

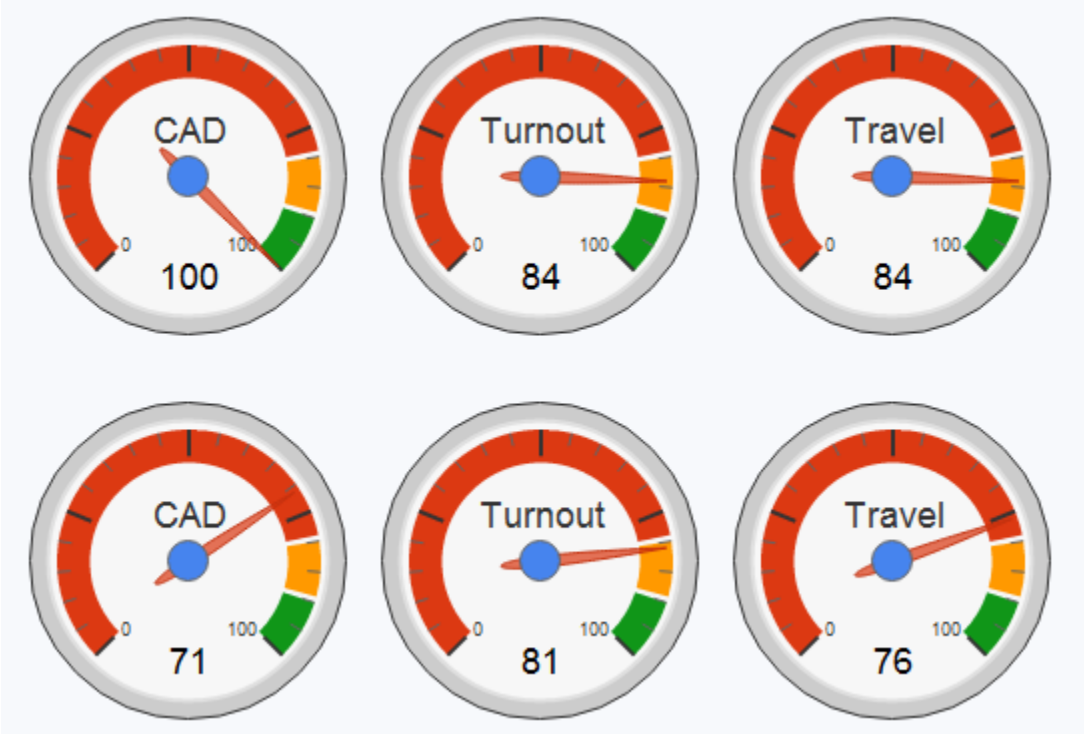


Each page within the QI Monitor includes links to operation performance measurements. Links include:

- Data Quality Monitor 1st Arrivals and All Responses
- Hourly Demand Graph Past 24 / 72 Hours
- Most Active Station Areas Pie Chart Past 24 / 72 Hours
- Most Active Apparatus Pie Chart Past 24 / 72 Hours
- Responses by Company Type Bar Chart Past 24 / 72 Hours
- Missed Goals Ratio Pie Chart Past 24 / 72 Hours
- Missed Call Processing Goals Past 72 Hours
- Missed Turnout Goals Past 72 Hours
- Missed Travel Time Goals Past 72 Hours

The gauges on the opening page track compliance with Call Processing, Turnout and Travel Time goals. Simply press the web browser's "reload" button to update these gauges.

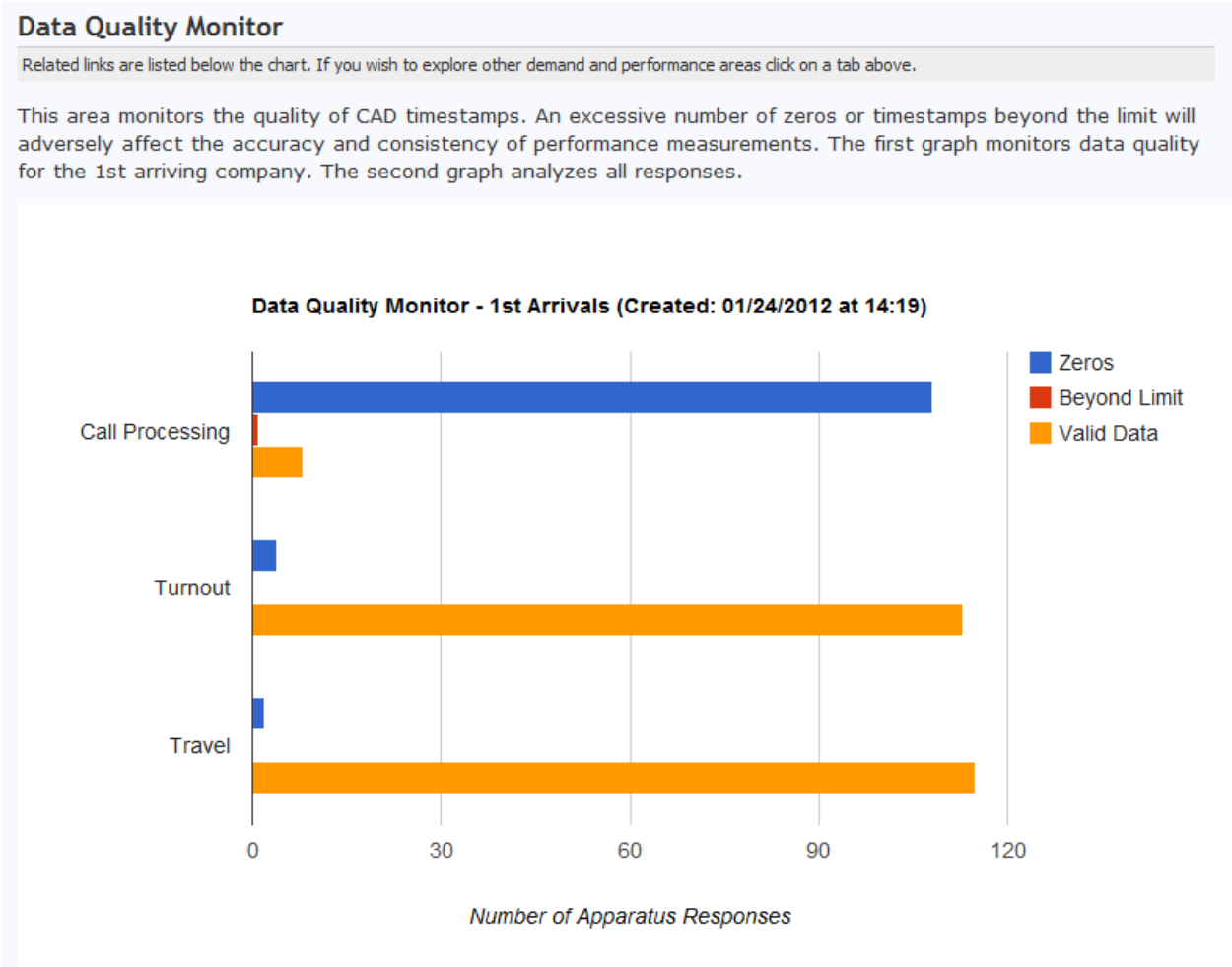
Notice the first row of gauges track performance in the last 24 hours while the second row tracks performance for the past 72 hours. These measurements allow you to determine if compliance is tracking higher or lower. Here we see a Turnout compliance of 84% in the past 24-hours is tracking higher than the 81% compliance at 72-hours.



The Data Quality Monitor

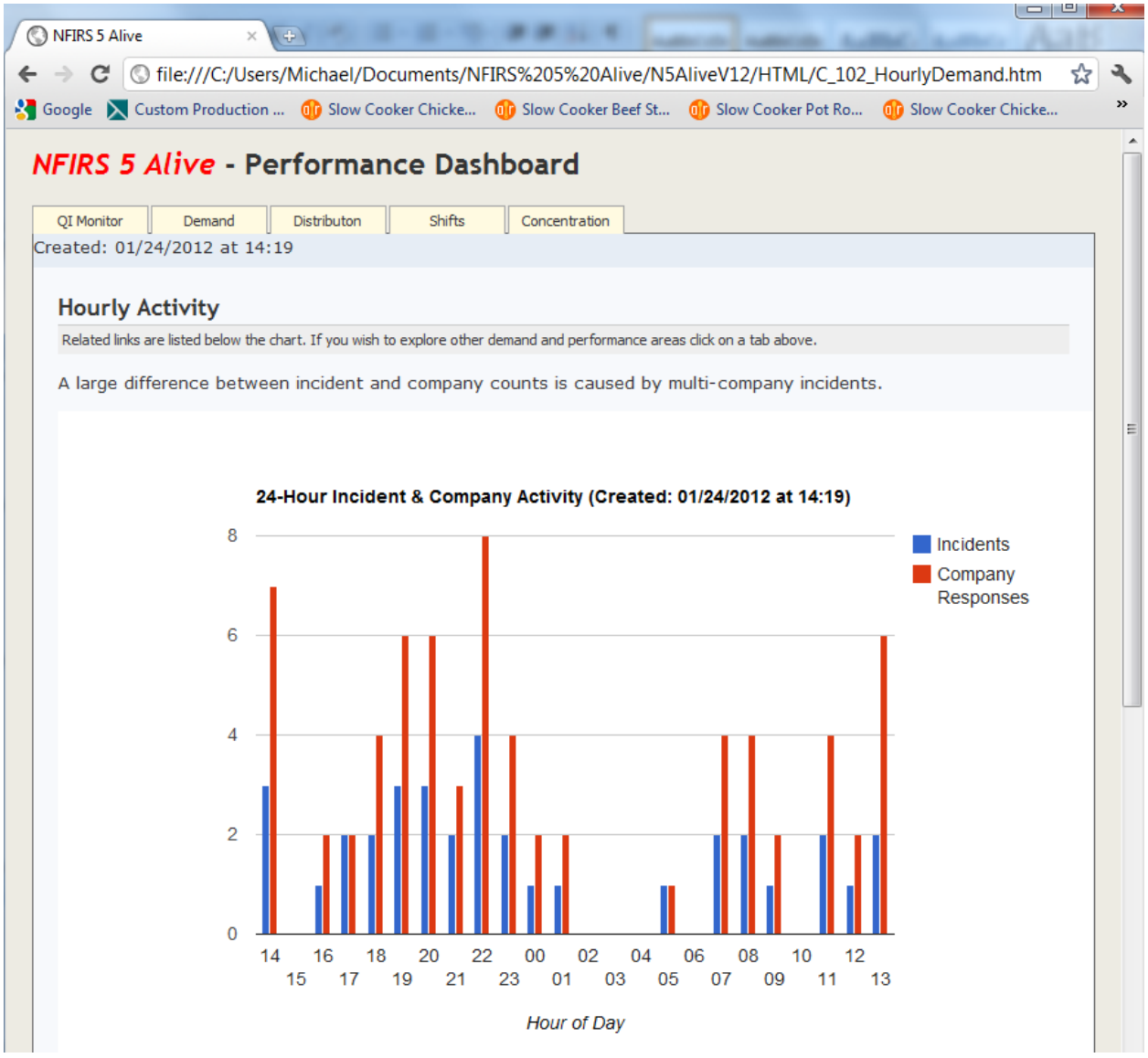
The "Data Quality Monitor" monitors the quality of data being exported from CAD. Here's an example of CAD data where there is an unusual number of Call Processing durations of zero. This can occur when CAD timestamps the "Time of Call" and "Time of Dispatch" as exactly the same time. The Data Quality Monitor detects this problem and quickly identifies it with an extended blue bar.

Outlier limits are set by the user. If Turnout beyond 5-minutes (300 seconds – user defined) the record is excluded from Turnout analysis and reported here in the Data Quality Monitor.



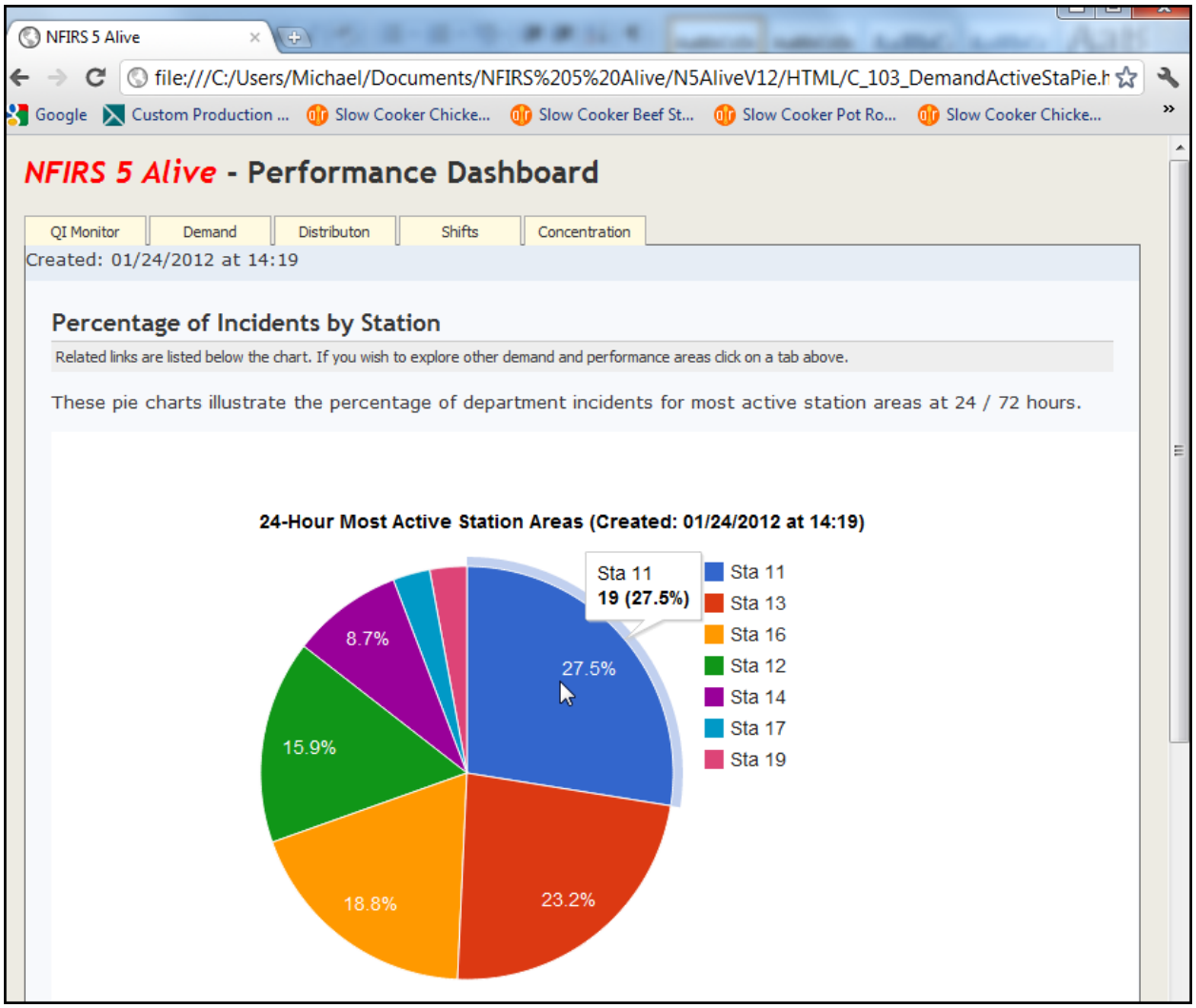
This demand graph is updated hourly. It shows both Incident and Apparatus activity patterns. When Incident activity equals Apparatus activity each incident has been handled with the response of one apparatus. However, when Apparatus activity moves well beyond incident activity multiple apparatus are responding on single incidents.

As you can see incident complexity can drive apparatus responses well above incident counts. This graphic monitors both the number and complexity of incident activity.

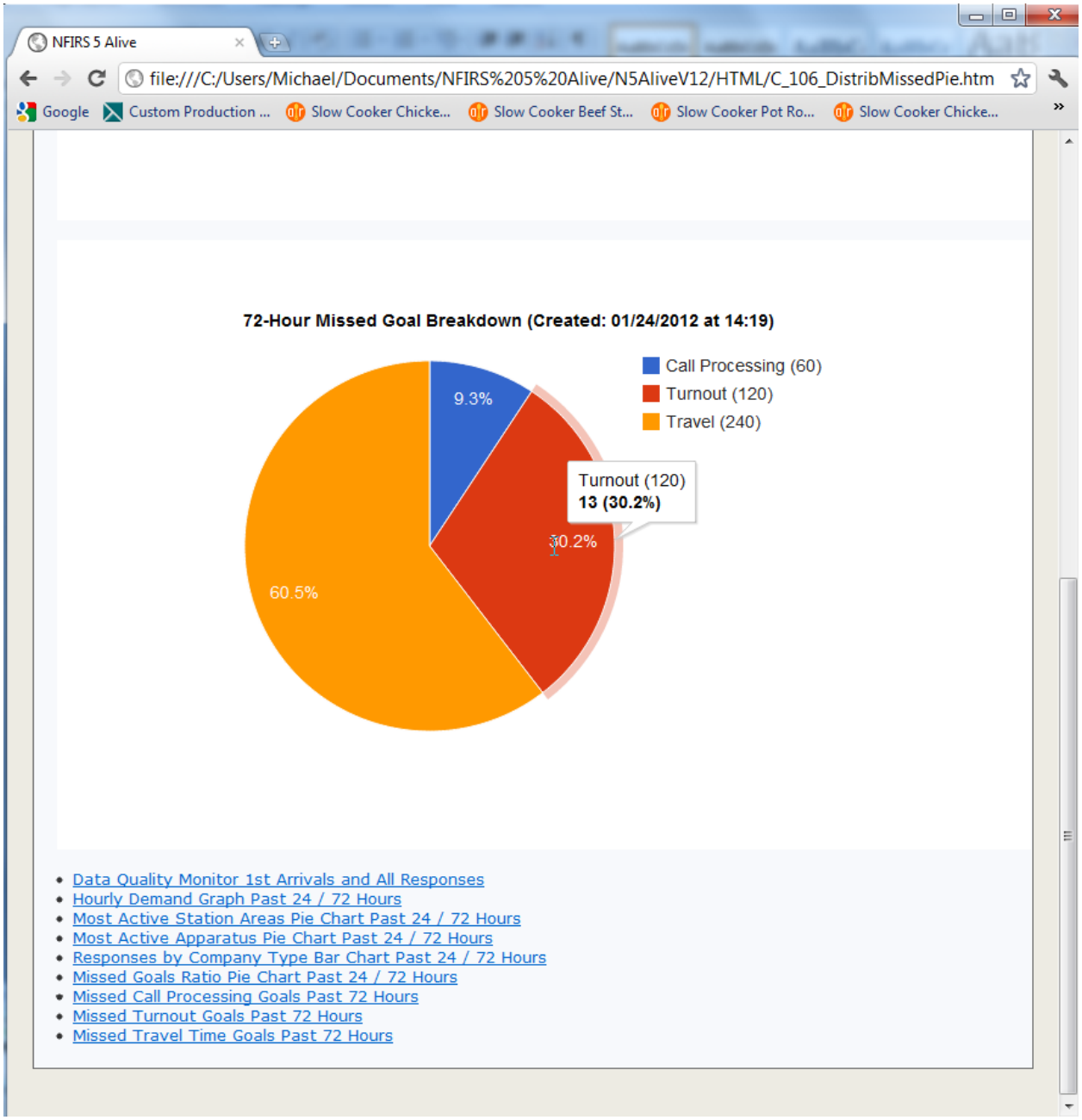


This pie chart monitors the top 10 fire stations showing the percentage of incidents handled by station. If you move your mouse over an element of the pie chart you will get additional information about that element.

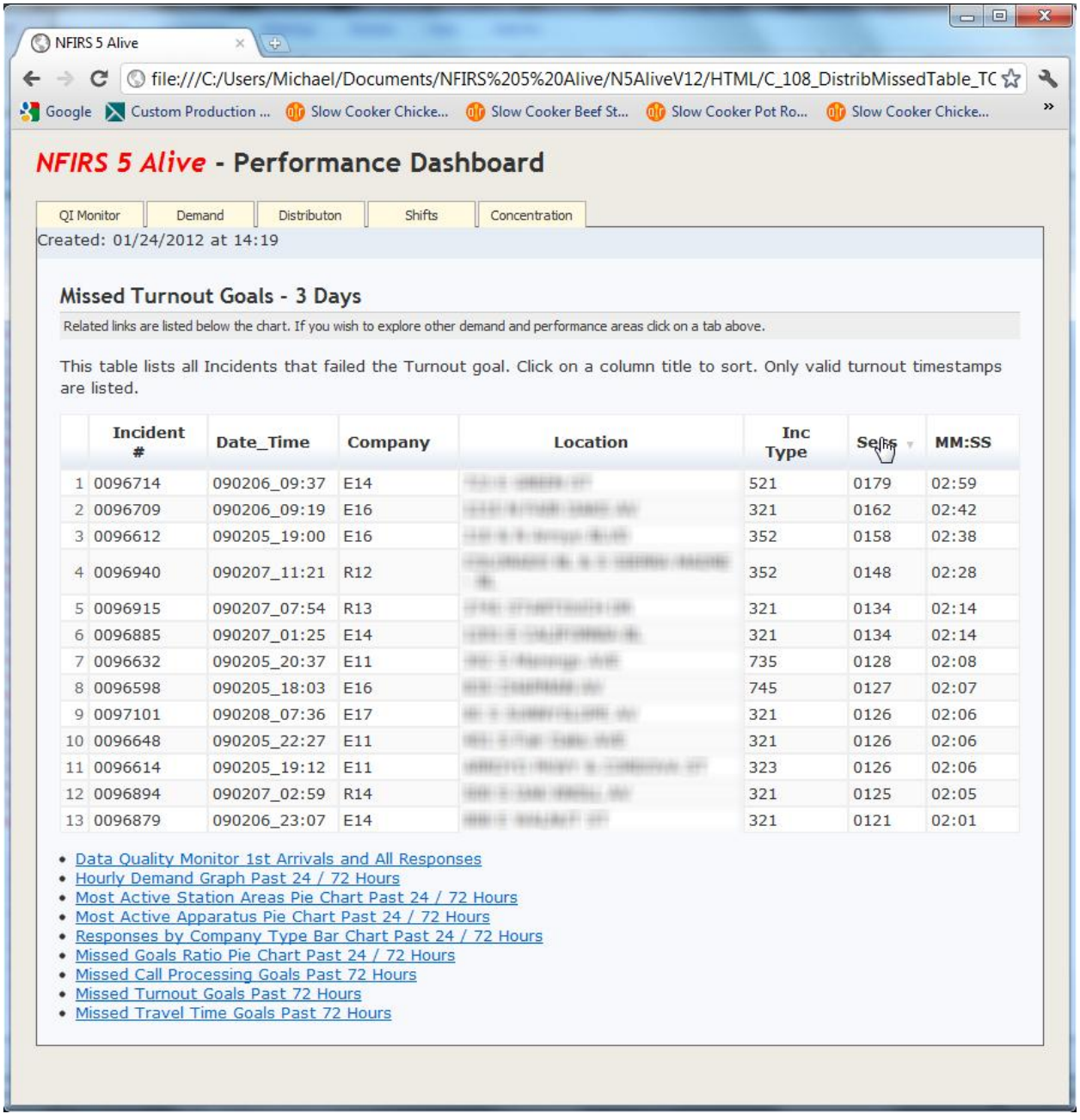
Here Station 11 had 19-incidents in the past 24 hours for a total of 27.5% of fire department responses.



This pie chart is illustrating missed goals over the past 72-hours. Notice Call Processing (at 60 seconds), Turnout (at 120 seconds) and Travel (at 240 seconds) are being tracked. During the past 72-hours the 120 second Turnout goal was missed 13 times.



In this page we see a list of the 13 first arriving apparatus that had a turnout time greater than 120 seconds. Notice you can click on a column title to sort by that column. Here responses have been sorted to show those with the longest Turnout time.



	Incident #	Date_Time	Company	Location	Inc Type	Secs	MM:SS
1	0096714	090206_09:37	E14		521	0179	02:59
2	0096709	090206_09:19	E16		321	0162	02:42
3	0096612	090205_19:00	E16		352	0158	02:38
4	0096940	090207_11:21	R12		352	0148	02:28
5	0096915	090207_07:54	R13		321	0134	02:14
6	0096885	090207_01:25	E14		321	0134	02:14
7	0096632	090205_20:37	E11		735	0128	02:08
8	0096598	090205_18:03	E16		745	0127	02:07
9	0097101	090208_07:36	E17		321	0126	02:06
10	0096648	090205_22:27	E11		321	0126	02:06
11	0096614	090205_19:12	E11		323	0126	02:06
12	0096894	090207_02:59	R14		321	0125	02:05
13	0096879	090206_23:07	E14		321	0121	02:01

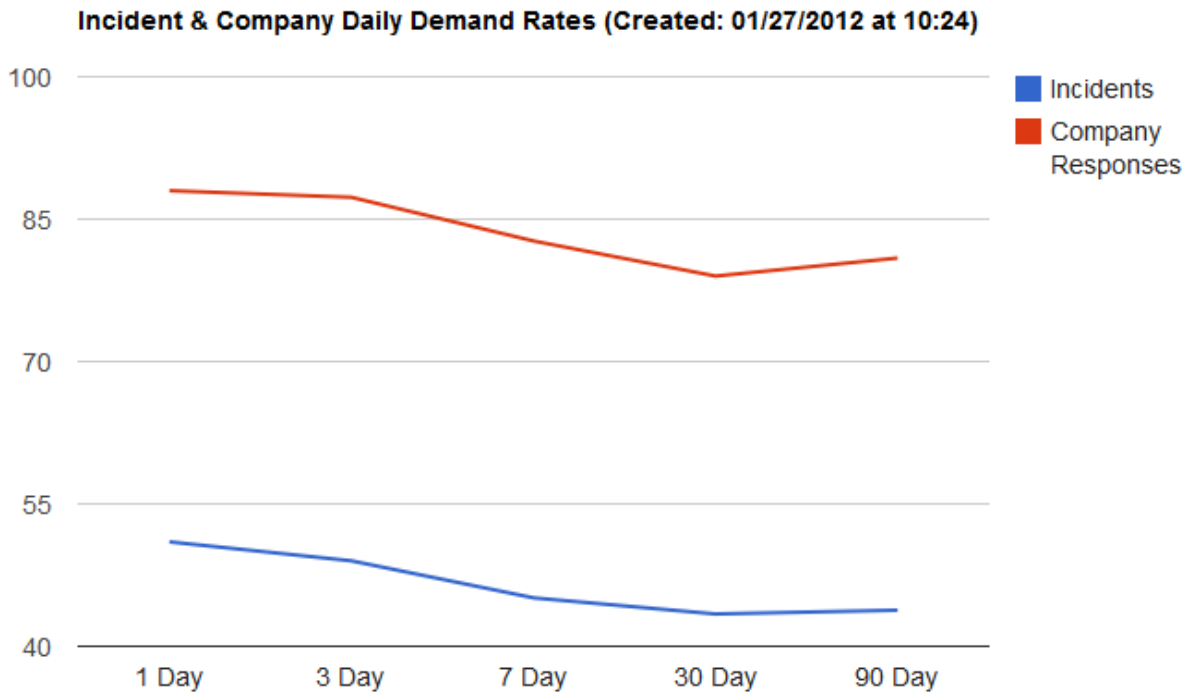
Tactical Analytics

Tactical analytics focus on performance trends. In the QI Dashboard tactical trends are tracked at 3, 7, 30 and 90 days. By measuring the "per-day" rate at each of these time intervals we can determine if performance is trending up or down.

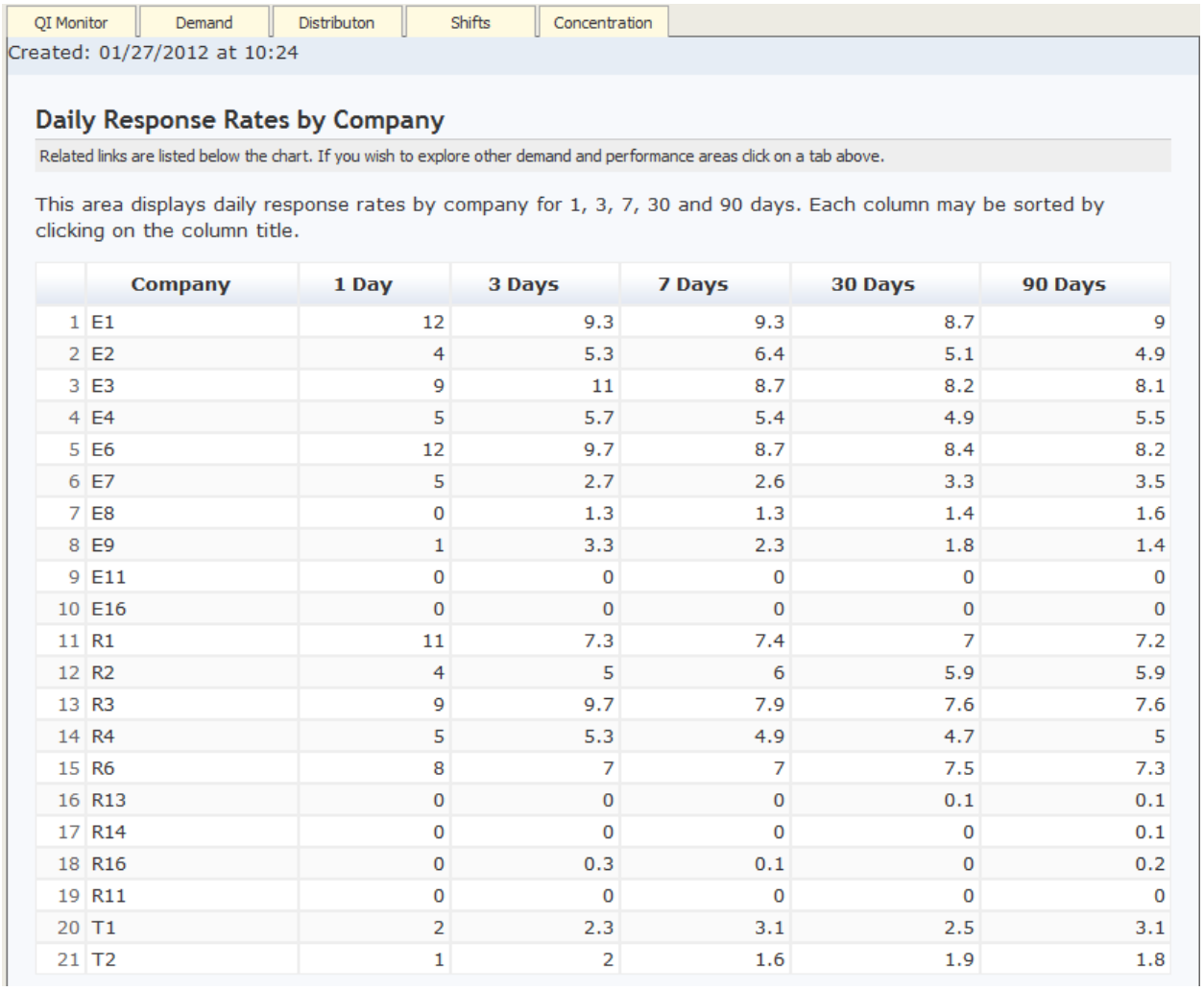
Tactical analytics are ideal for determining the impact of an operational change. For example, if a fire station is closed trend lines will soon measure the impact on performance trends.

Demand

Demand measures fire department activity trends. Here we see greater activity rates in the past day, 3 days and 7 days. So activity is trending higher.



Response rates are also broken down by station area and company. Here's an example of a company breakdown using a table to illustrate responses per day. Remember, each column can be sorted by clicking on the column title.



QI Monitor | Demand | Distributon | Shifts | Concentration

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Daily Response Rates by Company

Related links are listed below the chart. If you wish to explore other demand and performance areas click on a tab above.

This area displays daily response rates by company for 1, 3, 7, 30 and 90 days. Each column may be sorted by clicking on the column title.

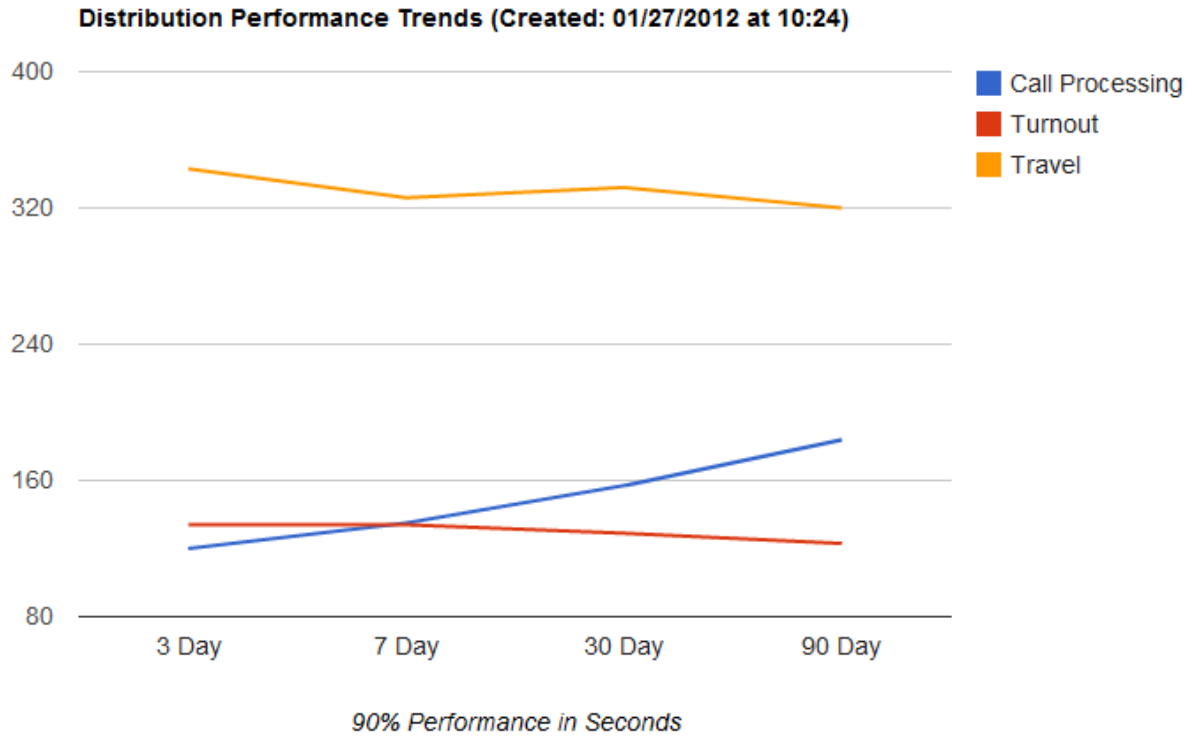
	Company	1 Day	3 Days	7 Days	30 Days	90 Days
1	E1	12	9.3	9.3	8.7	9
2	E2	4	5.3	6.4	5.1	4.9
3	E3	9	11	8.7	8.2	8.1
4	E4	5	5.7	5.4	4.9	5.5
5	E6	12	9.7	8.7	8.4	8.2
6	E7	5	2.7	2.6	3.3	3.5
7	E8	0	1.3	1.3	1.4	1.6
8	E9	1	3.3	2.3	1.8	1.4
9	E11	0	0	0	0	0
10	E16	0	0	0	0	0
11	R1	11	7.3	7.4	7	7.2
12	R2	4	5	6	5.9	5.9
13	R3	9	9.7	7.9	7.6	7.6
14	R4	5	5.3	4.9	4.7	5
15	R6	8	7	7	7.5	7.3
16	R13	0	0	0	0.1	0.1
17	R14	0	0	0	0	0.1
18	R16	0	0.3	0.1	0	0.2
19	R11	0	0	0	0	0
20	T1	2	2.3	3.1	2.5	3.1
21	T2	1	2	1.6	1.9	1.8

Distribution

Distribution measures performance. Typically there are three performance elements - Call Processing, Turnout and Travel. The most widely accepted measurement of performance is seconds to 90% compliance.

Here's an example of performance trends over time for Call Processing, Turnout and Travel.

Notice the lower the line the shorter the duration in seconds. So in this example Call Processing is trending better while Travel is trending toward longer durations.



Here we can see 90% Turnout time trends by station area. We clicked on the “3 Days” title to sort so the Station with the longest turnout time appears first. Here the duration to 90% is measured in minutes and seconds.

The number in the parentheses indicates the number of incidents used to establish the turnout time. Notice Station 08 has few incidents. Turnout time at this station is volatile when calculated using just a few responses experienced in one or even three days. Turnout time become more stable at 30 and 90 days.

90% Turnout Seconds by Station

Related links are listed below the chart. If you wish to explore other demand and performance areas click on a tab above.

This area displays 90% Turnout seconds by Station for 1, 3, 7, 30 and 90 days. Each column may be sorted by clicking on the column title.

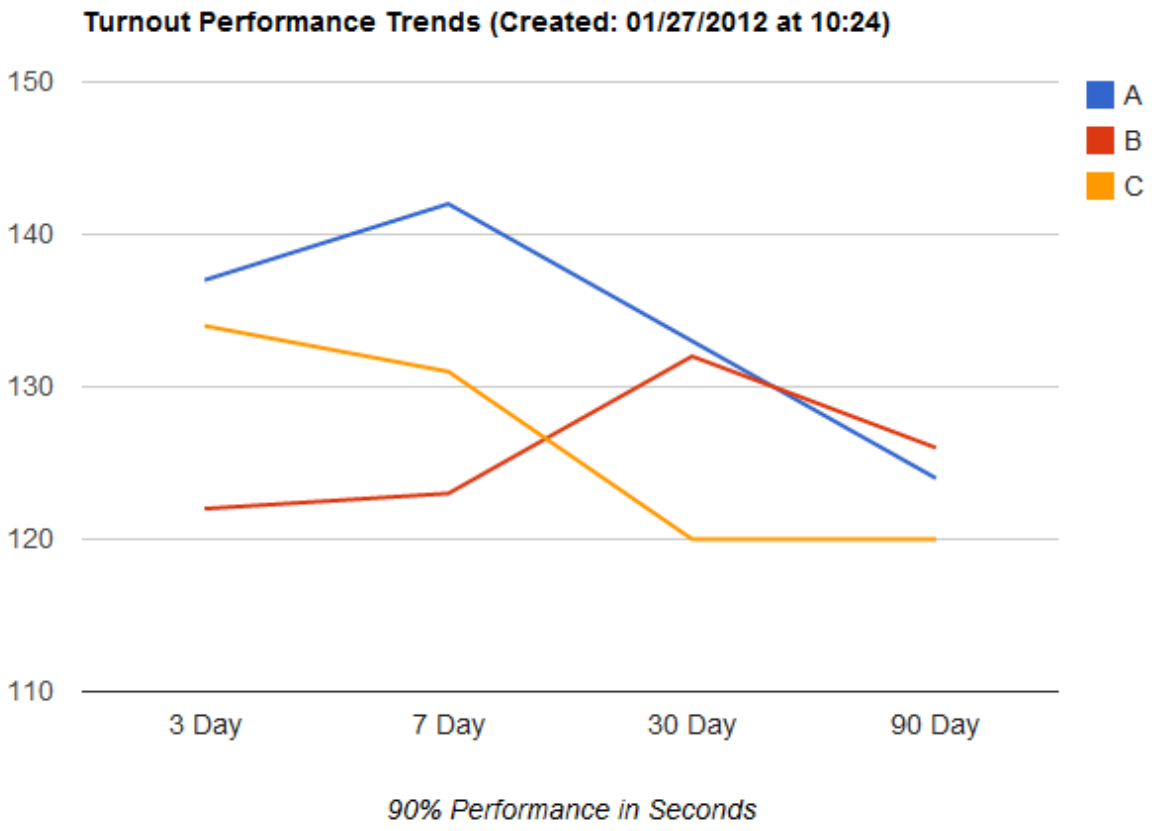
	Station	1 Day	3 Days	7 Days	30 Days	90 Days
1	09	01:17 (1)	02:42 (11)	02:34 (16)	02:16 (46)	02:07 (108)
2	04	02:39 (5)	02:39 (15)	02:25 (30)	02:10 (129)	02:04 (445)
3	01	02:17 (15)	02:15 (33)	02:16 (79)	02:07 (321)	02:00 (1,025)
4	03	02:17 (9)	02:14 (29)	02:19 (58)	02:20 (255)	02:14 (753)
5	07	02:02 (5)	02:02 (11)	01:57 (21)	01:48 (105)	01:47 (322)
6	06	01:59 (11)	01:59 (27)	01:42 (58)	01:58 (251)	01:58 (736)
7	02	01:40 (5)	01:58 (18)	02:12 (47)	02:07 (162)	01:58 (478)
8	08	00:00 (0)	00:29 (3)	01:10 (7)	01:49 (33)	01:49 (119)

- Missed Goals by Time Past 7, 30 and 90 days
- Missed Goals by Company Type Past 7, 30 and 90 days
- 90% Call Processing Performance Trends by Station
- 90% Turnout Performance Trends by Station
- 90% Travel Performance Trends by Station
- 90% Call Processing Performance Trends by Company
- 90% Turnout Performance Trends by Company
- 90% Travel Performance Trends by Company

Shifts

The Shifts tab allows you to compare distribution performance by shift. This graph shows a comparison of shift performance over time.

Notice “B” shift performance (red) is trending down (shorter duration, better performance) while “C” shift performance (orange) is trending up (longer duration, worsening performance).



Again, it's possible to analyze these trends by station and by company. Here's a company analysis sorted to show the slowest 3-day turnout time performance by company and shift.

Remember, turnout time, like other distribution measurements, is less volatilize and more representative when it is based on a higher number of responses.

90% Turnout Seconds by Company

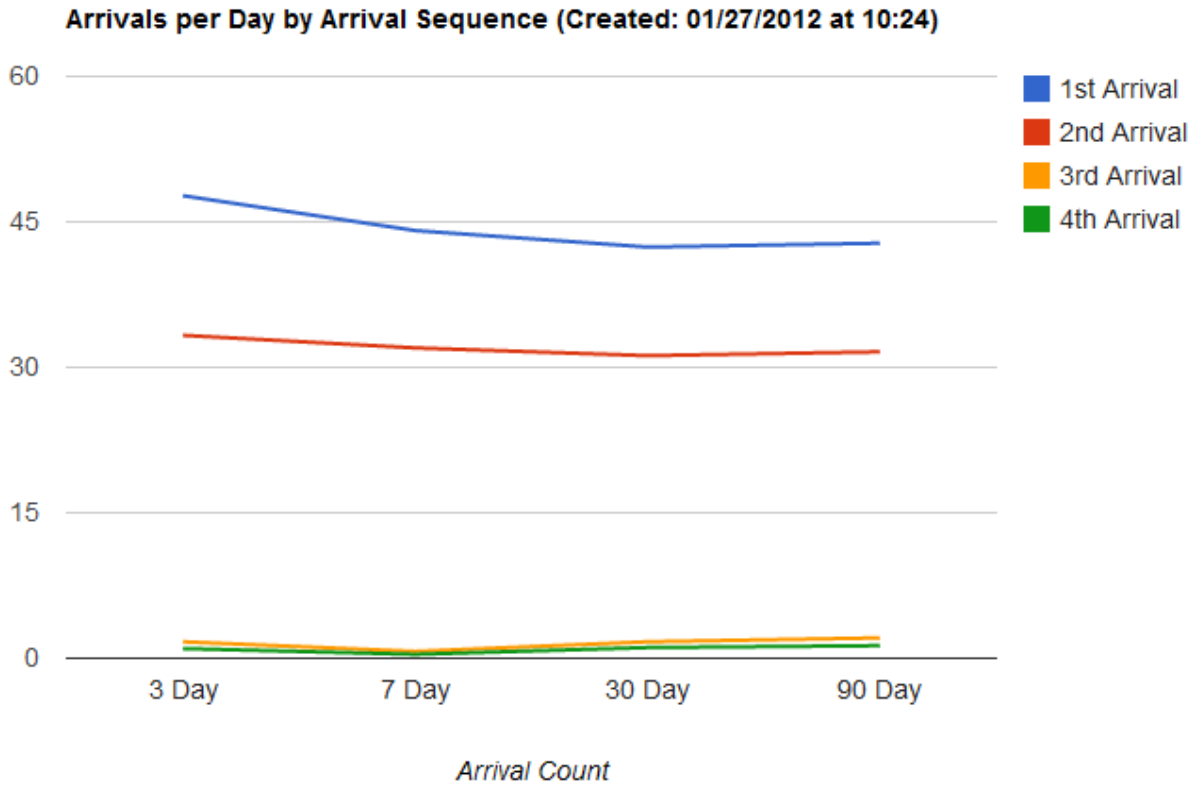
Related links are listed below the chart. If you wish to explore other demand and performance areas click on a tab above.

This area displays 90% Turnout seconds by 1st arriving company for 1, 3, 7, 30 and 90 days. Each column may be sorted by clicking on the column title.

	Company_Shift	1 Day	3 Days	7 Days	30 Days	90 Days
1	R1_C	02:15 (5)	04:36 (9)	04:36 (9)	02:15 (25)	02:17 (74)
2	E9_C	00:00 (0)	02:42 (2)	02:42 (2)	02:14 (14)	01:47 (38)
3	E4_C	02:39 (4)	02:39 (10)	02:39 (10)	02:12 (39)	02:10 (137)
4	T1_C	02:17 (2)	02:34 (4)	02:34 (4)	02:00 (21)	01:58 (67)
5	T2_B	00:00 (0)	02:31 (1)	02:31 (1)	02:31 (7)	02:17 (19)
6	E3_B	00:00 (0)	02:19 (12)	02:23 (27)	02:36 (54)	02:31 (159)
7	E1_C	02:18 (6)	02:18 (12)	02:18 (12)	02:16 (74)	02:07 (207)
8	E3_A	02:17 (2)	02:17 (2)	02:34 (8)	02:20 (43)	02:25 (139)
9	R6_C	02:11 (4)	02:11 (5)	02:11 (6)	01:30 (32)	01:52 (77)
10	E7_C	02:02 (4)	02:02 (6)	02:02 (6)	01:52 (32)	01:52 (86)
11	E2_B	00:00 (0)	02:02 (4)	02:22 (13)	02:21 (32)	02:00 (84)
12	E6_B	00:00 (0)	02:01 (6)	01:59 (21)	02:06 (65)	02:09 (214)
13	R1_B	00:00 (0)	02:01 (2)	02:01 (7)	02:01 (25)	02:07 (83)
14	E3_C	01:57 (6)	01:59 (12)	01:59 (13)	01:57 (80)	01:58 (190)
15	E2_C	01:12 (4)	01:58 (9)	01:58 (9)	01:38 (40)	01:57 (112)
16	E1_A	01:58 (2)	01:58 (3)	03:03 (14)	02:07 (59)	01:59 (199)
17	E1_B	00:00 (0)	01:45 (4)	01:48 (17)	01:57 (59)	01:54 (181)
18	T2_C	01:40 (1)	01:40 (2)	01:40 (2)	01:51 (11)	01:53 (30)
19	E6_C	01:59 (7)	01:38 (13)	01:38 (13)	01:53 (66)	01:53 (174)
20	E9_B	00:00 (0)	01:34 (4)	01:34 (4)	02:11 (11)	02:03 (29)
21	E4_B	00:00 (0)	01:31 (4)	01:53 (9)	01:54 (39)	01:49 (123)
22	R3_C	00:57 (1)	01:29 (4)	01:29 (4)	01:40 (22)	02:00 (73)
23	R4_B	00:00 (0)	01:27 (1)	01:27 (3)	02:31 (11)	02:31 (36)
24	R3_B	00:00 (0)	01:26 (1)	01:26 (5)	01:57 (27)	02:00 (82)
25	R6_B	00:00 (0)	01:18 (3)	01:39 (9)	01:39 (28)	01:46 (72)
26	E4_A	01:10 (1)	01:10 (1)	02:10 (11)	02:11 (35)	02:03 (136)
27	R2_B	00:00 (0)	01:04 (1)	01:19 (5)	02:23 (16)	02:16 (50)

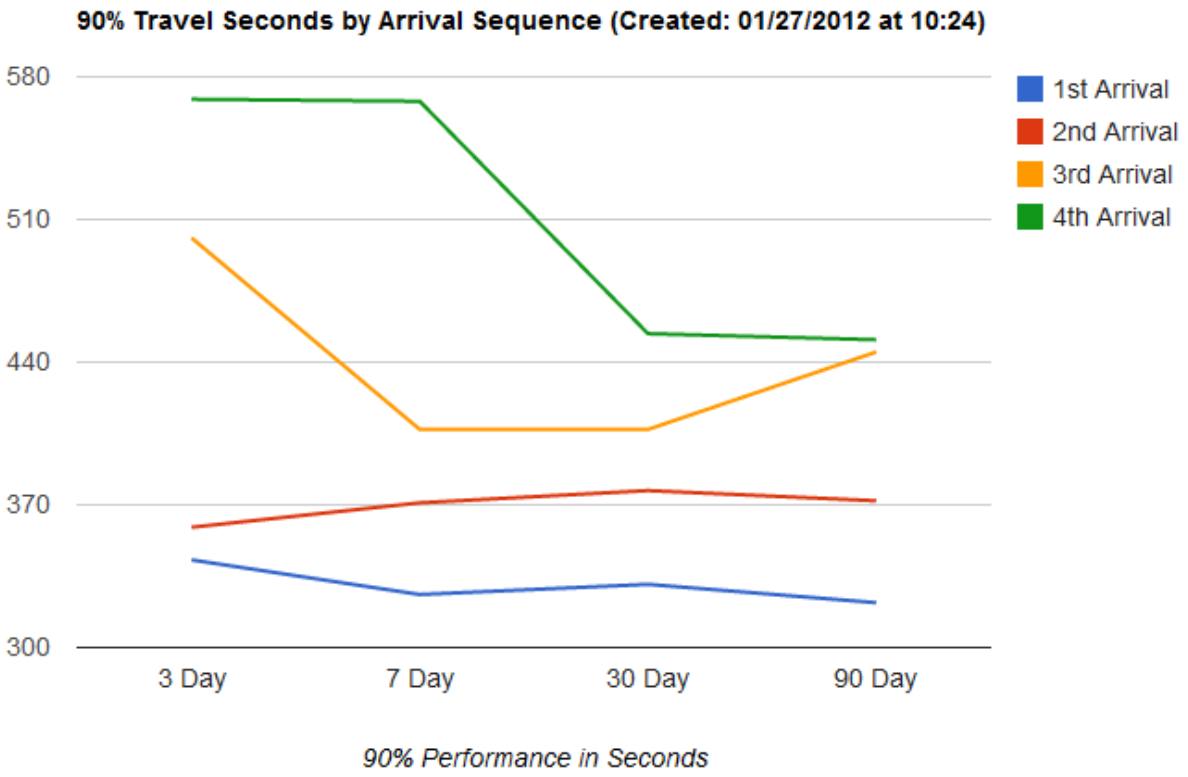
Concentration

Concentration measures the time necessary to assemble teams of apparatus at incidents. The chart below shows the number of arrivals by arrival sequence. Notice there are very high rates of 1st and 2nd apparatus arrivals. By contrast, incidents with 3rd and 4th arriving companies are comparatively rare.



You cannot fully understand the time it takes for multiple companies to arrive if you do not first understand the number of each arrival. Because 3rd and 4th arrivals are far less frequent the travel time for these later arriving apparatus will be far more volatile.

This graph shows 90% travel time trends by Arrival. 1st Arrivals (in blue) are at the bottom of the chart because travel duration is shorter. Since 90-day measurements base travel time calculations on the largest number of responses the 90-day measurement will be less volatile. Notice at 3-days the small number of incidents tends to generate volatile performance measurements.



Here's a breakdown for engine arrivals by station. Notice both 30 day and 90 day measurements are provided to help establish more stable trend lines for 1st, 2nd, 3rd and 4th engine arrivals.

Station Travel Time for Engine Arrivals

Concentration measures the travel time performance of multiple apparatus arrivals. Company officers and station commanders should be aware of opportunites to improve performance based on problems identified by station area or company. Charts in this area are updated daily.

This table analyzes arrivals of engines by station. Both 30 and 90 day calculations are provided to enable trend analysis. The number in parentheses is the number of incidents used for the calculation. The higher the number of incidents the more accurate the travel time calculation. Click on column titles to sort items in a column.

	Station	1st 30 Day	1st 90 Day	2nd 30 Day	2nd 90 Day	3rd 30 Day	3rd 90 Day	4th 30 Day	4th 90 Day
1	01	05:48 (310)	05:40 (978)	06:11 (202)	05:35 (629)	05:07 (15)	06:40 (39)	05:38 (10)	05:38 (23)
2	02	05:28 (159)	05:28 (461)	05:50 (121)	06:31 (366)	06:17 (5)	08:19 (21)	09:28 (5)	09:28 (14)
3	03	04:55 (249)	05:00 (722)	05:36 (198)	05:26 (573)	07:02 (6)	07:02 (31)	07:34 (5)	06:46 (23)
4	04	06:05 (127)	05:16 (429)	05:31 (79)	05:31 (293)	06:37 (5)	05:19 (21)	06:16 (2)	06:46 (15)
5	06	04:13 (245)	04:26 (719)	05:42 (201)	05:40 (586)	06:30 (11)	06:30 (38)	07:48 (8)	07:44 (24)
6	07	06:39 (103)	05:44 (313)	07:23 (82)	07:25 (250)	08:21 (5)	08:21 (18)	09:29 (2)	10:02 (9)
7	08	06:20 (32)	06:26 (110)	07:43 (26)	08:17 (81)	09:48 (1)	09:48 (11)	00:00 (0)	06:28 (4)
8	09	06:19 (45)	06:22 (107)	08:13 (27)	09:12 (63)	07:42 (4)	11:28 (6)	00:00 (0)	05:21 (2)

- EMS Arrival Counts / 90% Travel Time Seconds
- Engine Arrival Counts / 90% Travel Time Seconds
- Ladder Arrival Counts / 90% Travel Time Seconds
- All Station Arrivals
- EMS Station Arrivals
- Engine Station Arrivals
- Ladder Station Arrivals

All tactical performance measurements are calculated daily.

This web-based analytic is under development. Your comments and questions are welcomed.

Michael Fay

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