

Eliminate the Paper, Analyze the Data – Implement a Mobile Rolling PM Application

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2018 Fare Collection/Revenue Management
& TransTech Conferences

Key Presentation Take Away

- How to design and develop a simple mobile application to collect inspection and maintenance data in real time
- Deploy the mobile application solution across the organization
- Mine the data produced to more efficiently manage assets and people

The Process

Define the need

- Create the business case
- Define current state and future state



Develop the solution

- Focus on the user
- Leverage technology



Implement

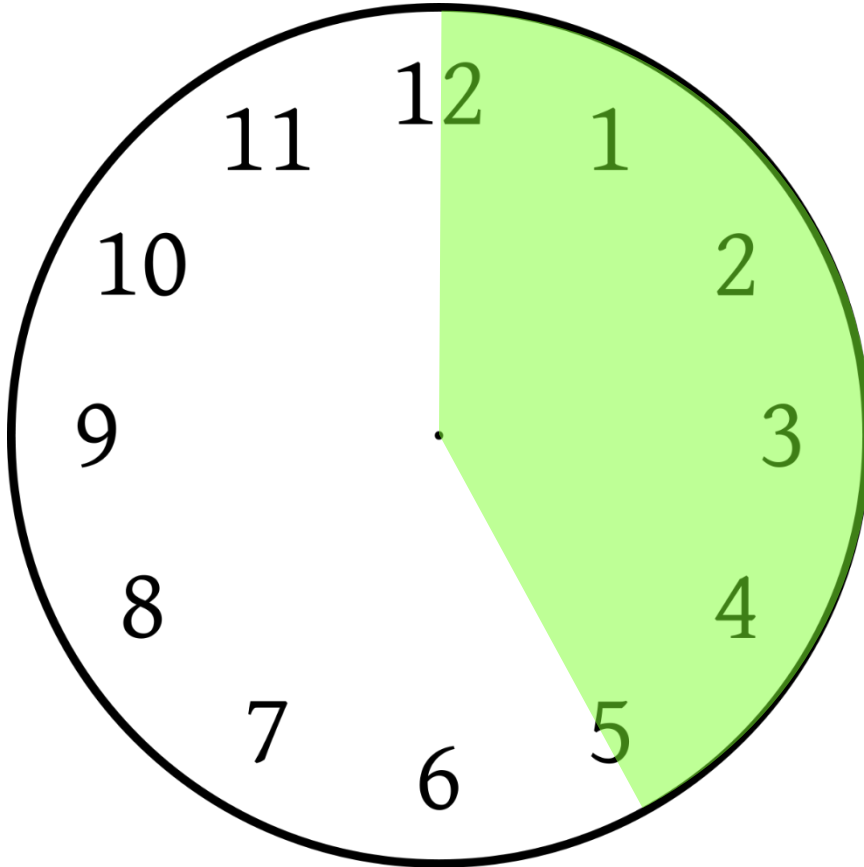
- Start small; think big



Scenario

- Transit agencies are required to inspect all passenger rail cars before they are put into service – each and every day
- The inspection is valid for 24 hours
- The only way large transit agencies can assure compliance is to inspect their entire fleet before morning pull out

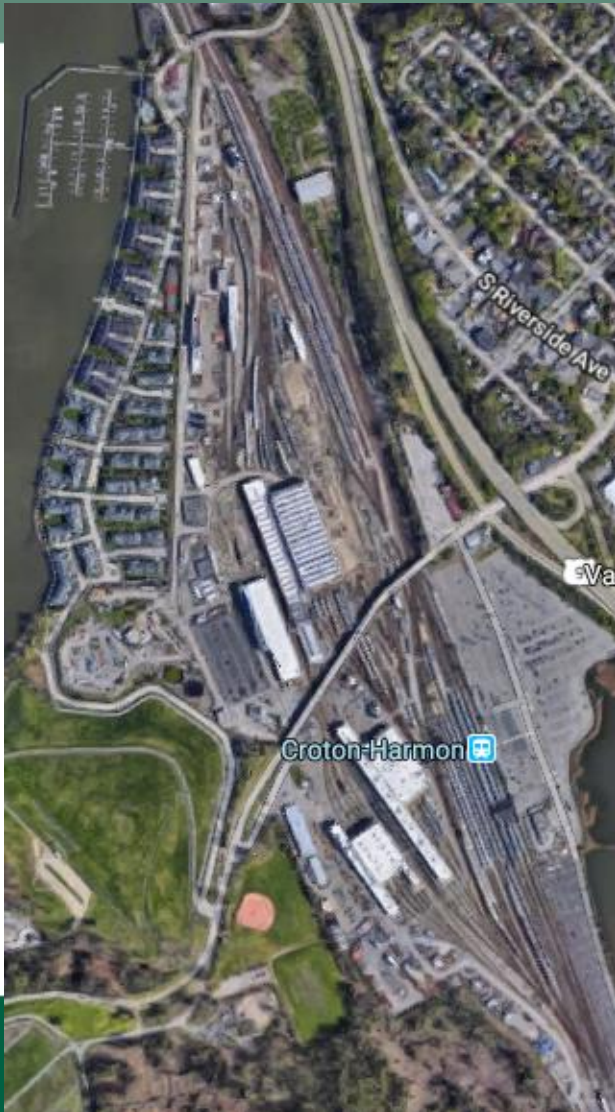
Time and Resources



All rail cars
inspected in a short
period of time

Yard Congestion

- Passenger rail car fleets are expanding to meet demand
- Yard space and maintenance facilities are **not** expanding



Geography

Rail cars inspected
here tonight . . .



. . . may be inspected
here tomorrow night.

Paper Based Process

DAILY REPORT OF UNITS INSPECTED
MAINTENANCE OF EQUIPMENT DEPARTMENT

INSTRUCTIONS:
 •Each unit must be inspected once in each 24 hour period and a report made on this form whether needing repairs or not.
 •The units found defective must be indicated hereon by placing a (x) mark on the space provided, and a separate report made on Form ME-9 (2C).
 •A (Δ) mark to indicate cab signal system has been validated and is operational and that all appropriate coocks, switches, and breakers are out-in and sealed.

The following units were inspected by the undersigned during the period of time indicated above and all were found without defects except those marked by a (x).

LOCATION: _____ DATE: 11/01/16 TIME: 07:00 AM PM

TRAIN NO. <u>706</u>			TRAIN NO. <u>716</u>			TRAIN NO. <u>722</u>			TRAIN NO. <u>736</u>			TRAIN NO.			TRAIN NO.		
TRACK NO. <u>9</u>			TRACK NO. <u>9</u>			TRACK NO. <u>5</u>			TRACK NO. <u>6</u>			TRACK NO.			TRACK NO.		
UNIT NO.	CS	DEF	UNIT NO.	CS	DEF	UNIT NO.	CS	DEF	UNIT NO.	CS	DEF	UNIT NO.	CS	DEF	UNIT NO.	CS	DEF
<u>4064</u>	<u>Δ</u>		<u>4326</u>	<u>Δ</u>		<u>4180</u>	<u>Δ</u>		<u>4100</u>	<u>Δ</u>							
<u>4065</u>			<u>4327</u>			<u>4181</u>			<u>4101</u>								
<u>4303</u>			<u>4306</u>			<u>4261</u>			<u>4004</u>								
<u>1302</u>			<u>4307</u>			<u>4260</u>			<u>4005</u>								
<u>4018</u>			<u>4091</u>			<u>4040</u>			<u>4270</u>								
<u>4019</u>			<u>4090</u>	<u>Δ</u>		<u>4041</u>	<u>Δ</u>		<u>4271</u>								
<u>4232</u>									<u>4031</u>								
<u>4233</u>	<u>Δ</u>								<u>4030</u>	<u>Δ</u>							

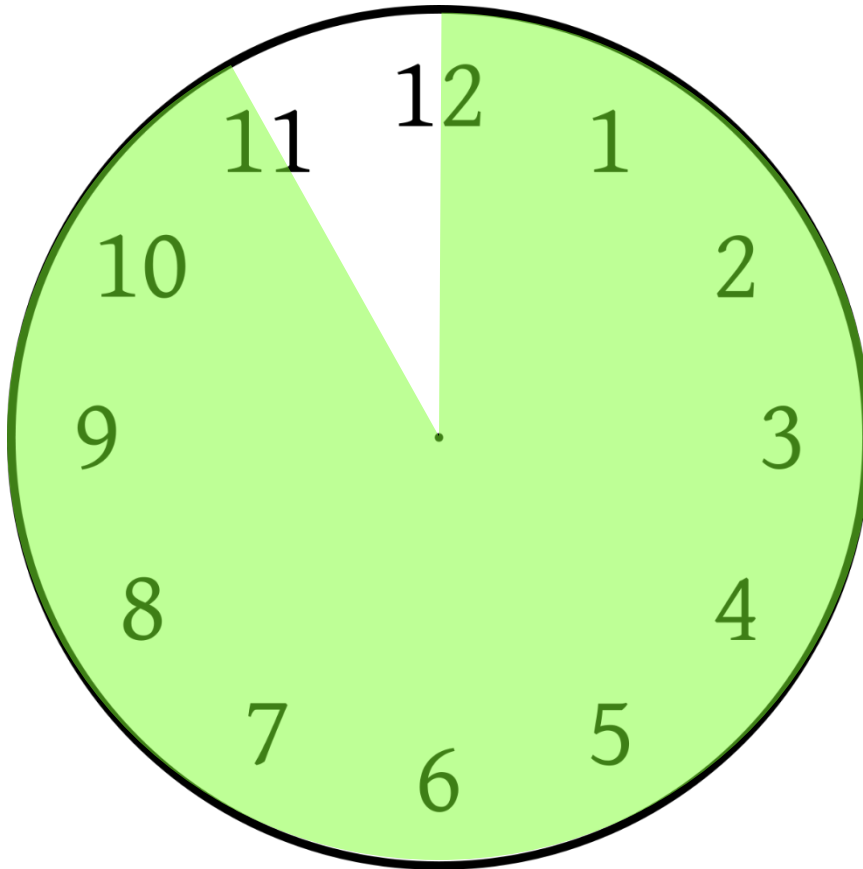
COMMENTS

EMPLOYEE #	PRINT NAME	SIGNATURE	OCCUPATION	DATE
<u>11025</u>	<u>DWAYNE ROCHESSE</u>	<u>[Signature]</u>	<u>ELECT.</u>	<u>11/01/16</u>
<u>11025</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>11/1/16</u>
<u>11025</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>11/1/16</u>

SUPERVISOR NAME: [Signature] EMPLOYEE # 11025

- Hard copy inspection reports
- Only verifies inspection completed
- “If” entered into asset management system, data is limited
- No analytics limiting resource management opportunities

The Business Goal

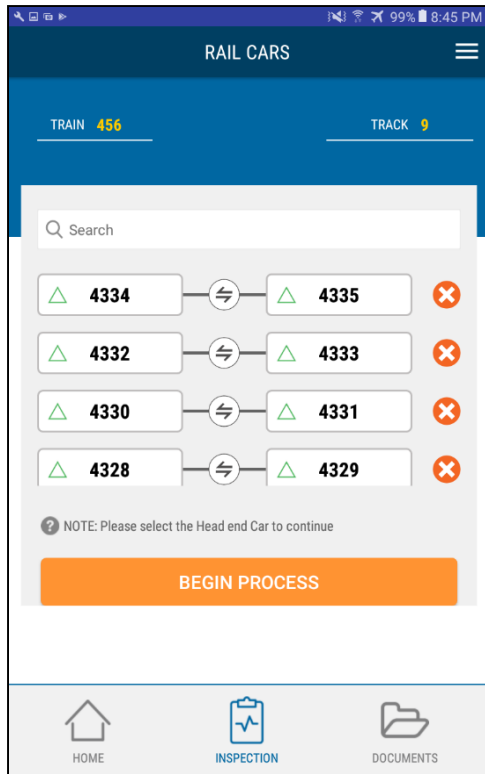


- Transition to a true 24 hour daily inspection cycle to:
 - efficiently manage yard space
 - comply with rolling stock inspection requirements
 - manage human assets

The need!

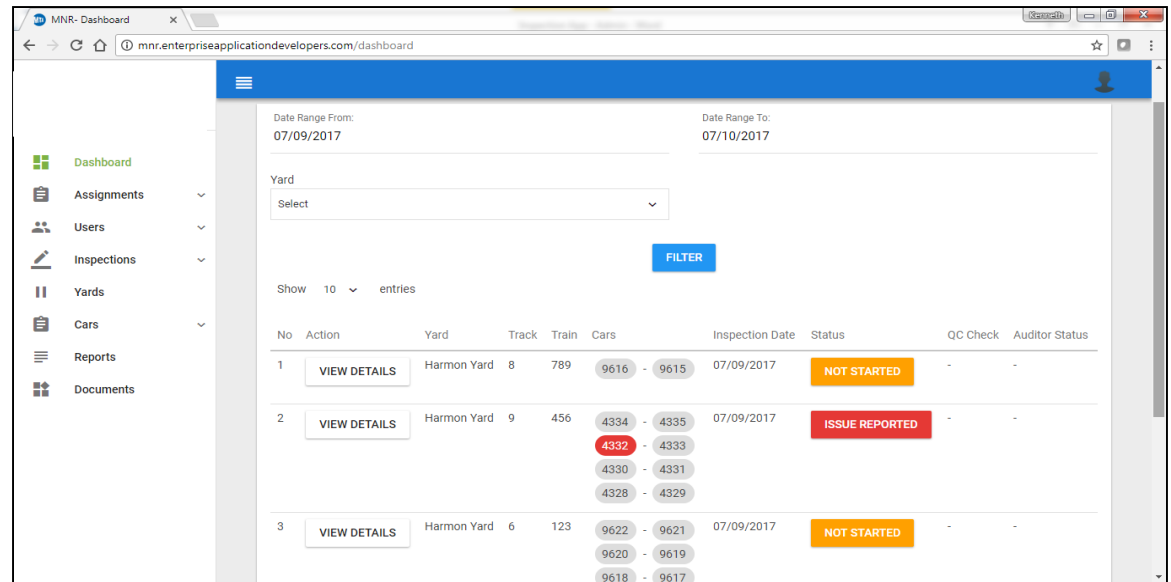
1. Effectively manage the 24-hour inspection window by:
 - Knowing exactly when an inspection is completed
 - Knowing exactly where an inspection is completed
2. Gather inspection data in real time
3. Utilize inspection data

The Solution

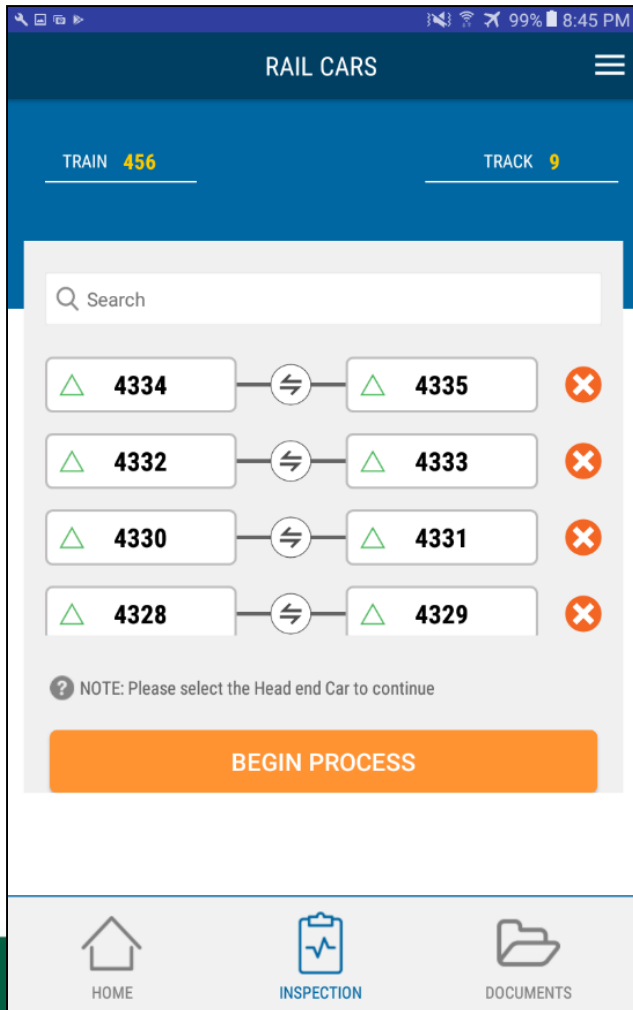


← Mobile inspection application

Real Time Dashboard



Mobile Application



- Designed for use on any mobile device
- Streamlines data gathering
- Mimics the inspection steps, not the data forms
- Utilizes simple drop down menus and limits text entry
- Enables the use of photos attached to inspection defects
- Pushes data real time to supervisor dashboard

The Dashboard

The screenshot displays the MNR Dashboard web application. The browser address bar shows the URL `mnr.enterpriseapplicationdevelopers.com/dashboard`. The page features a blue header with a user profile icon for 'Kenneth'. A left sidebar contains a menu with items: Dashboard, Assignments, Users, Inspections, Yards, Cars, Reports, and Documents. The main content area includes date range filters (07/09/2017 to 07/10/2017), a 'Yard' dropdown menu, and a 'FILTER' button. Below these is a table with 10 entries per page. The table columns are: No, Action, Yard, Track, Train, Cars, Inspection Date, Status, QC Check, and Auditor Status. Three entries are visible, each with a 'VIEW DETAILS' button and a status indicator (NOT STARTED or ISSUE REPORTED).

No	Action	Yard	Track	Train	Cars	Inspection Date	Status	QC Check	Auditor Status
1	VIEW DETAILS	Harmon Yard	8	789	9616 - 9615	07/09/2017	NOT STARTED	-	-
2	VIEW DETAILS	Harmon Yard	9	456	4334 - 4335 4332 - 4333 4330 - 4331 4328 - 4329	07/09/2017	ISSUE REPORTED	-	-
3	VIEW DETAILS	Harmon Yard	6	123	9622 - 9621 9620 - 9619 9618 - 9617	07/09/2017	NOT STARTED	-	-

The Dashboard

- Displays in real time all inspection activity
- Enables quicker response to time to maintenance issues – reducing delays
- Data mining opportunities are endless

What's Happening Behind the Curtain

- Actual inspection complete date and time being recorded – restarting the clock and inspection window
- Inspection issues identified in real time; resolution recorded in database
- Inspection data collected and shared across the system

Output

From this . . .

. . . to this

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 PM

TRAIN NO.	TRAIN NO.	TRAIN NO.	TRAIN NO.	TRAIN NO.	TRAIN NO.
<u>706</u>	<u>716</u>	<u>722</u>	<u>736</u>		
TRACK NO. <u>9</u>	TRACK NO. <u>9</u>	TRACK NO. <u>5</u>	TRACK NO. <u>6</u>	TRACK NO.	TRACK NO.
UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF
<u>4064</u> A	<u>4326</u> A	<u>4180</u> A	<u>4100</u> Δ		
<u>4066</u>	<u>4327</u>	<u>4181</u>	<u>4101</u>		
<u>4303</u>	<u>4306</u>	<u>4261</u>	<u>4004</u>		
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<u>4018</u>	<u>4091</u>	<u>4040</u>	<u>4270</u>		
<u>4019</u>	<u>4090</u> Δ	<u>4041</u> Δ	<u>4271</u>		
<u>4832</u>			<u>4051</u>		
<u>4233</u> A			<u>4030</u> Δ		

COMMENTS

EMPLOYEE # _____ PRINT NAME _____ SIGNATURE _____ OCCUPATION _____ DATE: _____

EMPLOYEE # _____ PRINT NAME DWAYNE ROCHESIA SIGNATURE [Signature] OCCUPATION ELECT. DATE: 11/01/16

EMPLOYEE # _____ PRINT NAME Edgewell SIGNATURE [Signature] OCCUPATION Carman DATE: 11/1/16

EMPLOYEE # _____ PRINT NAME _____ SIGNATURE _____ OCCUPATION _____ DATE: _____

SUPERVISOR NAME [Signature] EMPLOYEE # 11025



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LOCATION: Harmon Yard AGENCY: New York MTA DIVISION: Metro North Railroad REPORT GENERATED DATE: 04/04/2018

Train no :	Train no : 123	Train no :	Train no : 123	Train no : 456	Train no : 789
Track no : 6	Track no : 9 North	Track no :	Track no : 6	Track no : 10 Belly (Middle)	Track no : 15 North
INSPECTION DATE	TIME	INSPECTION DATE	TIME	INSPECTION DATE	TIME
<u>04/02/2018</u>	<u>17:53</u>	<u>04/02/2018</u>	<u>00:00</u>	<u>04/02/2018</u>	<u>16:03</u>
UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF	UNIT NO. CS DEF
8008	▲ X	4334	9500	8006	▲
8009	X	4335	9501	8007	
		4328		8004	
		4329		8005	
		4248		8002	
		4249		8003	▲
				9206	▲ X
				9207	
				9204	
				9205	
				9202	
				9203	
				4014	▲
				4015	
				4012	X
				4013	
				4010	
				4011	▲

Comments :

S.NO	EMPLOYEE #	PRINT NAME	SIGNATURE	OCCUPATION	DATE
1		Steven Gonzalez		Carman	07-24-18
2		Christopher Mammano		Electrician	07-24-18

Employee # : _____ Supervisor name: _____

And More

DAILY REPORT OF UNITS INSPECTED MAINTENANCE OF EQUIPMENT DEPARTMENT

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Train no :		Train no : 123		Train no :		Train no : 123		Train no : 456		Train no : 789	
Track no : 6		Track no : 9 North		Track no :		Track no : 6		Track no : 10 Belly (Middle)		Track no : 15 North	
INSPECTION DATE	TIME	INSPECTION DATE	TIME	INSPECTION DATE	TIME	INSPECTION DATE	TIME	INSPECTION DATE	TIME	INSPECTION DATE	TIME
04/02/2018	17:53	04/02/2018	00:00	04/02/2018	00:00	04/02/2018	16:03	04/02/2018	16:00	04/02/2018	15:55
UNIT NO	CS	DEF	UNIT NO	CS	DEF	UNIT NO	CS	DEF	UNIT NO	CS	DEF
8008	▲	X	4334			9500	▲		9206	▲	X
8009		X	4335			9501			9207		
			4328						9204		X
			4329						9205		
			4248						9202		
			4249						9203	▲	

Comments :

S.NO	EMPLOYEE #	PRINT NAME	SIGNATURE	OCCUPATION	DATE
1		Steven Gonzalez		Carman	07-24-18
2		Christopher Mammano		Electrician	07-24-18

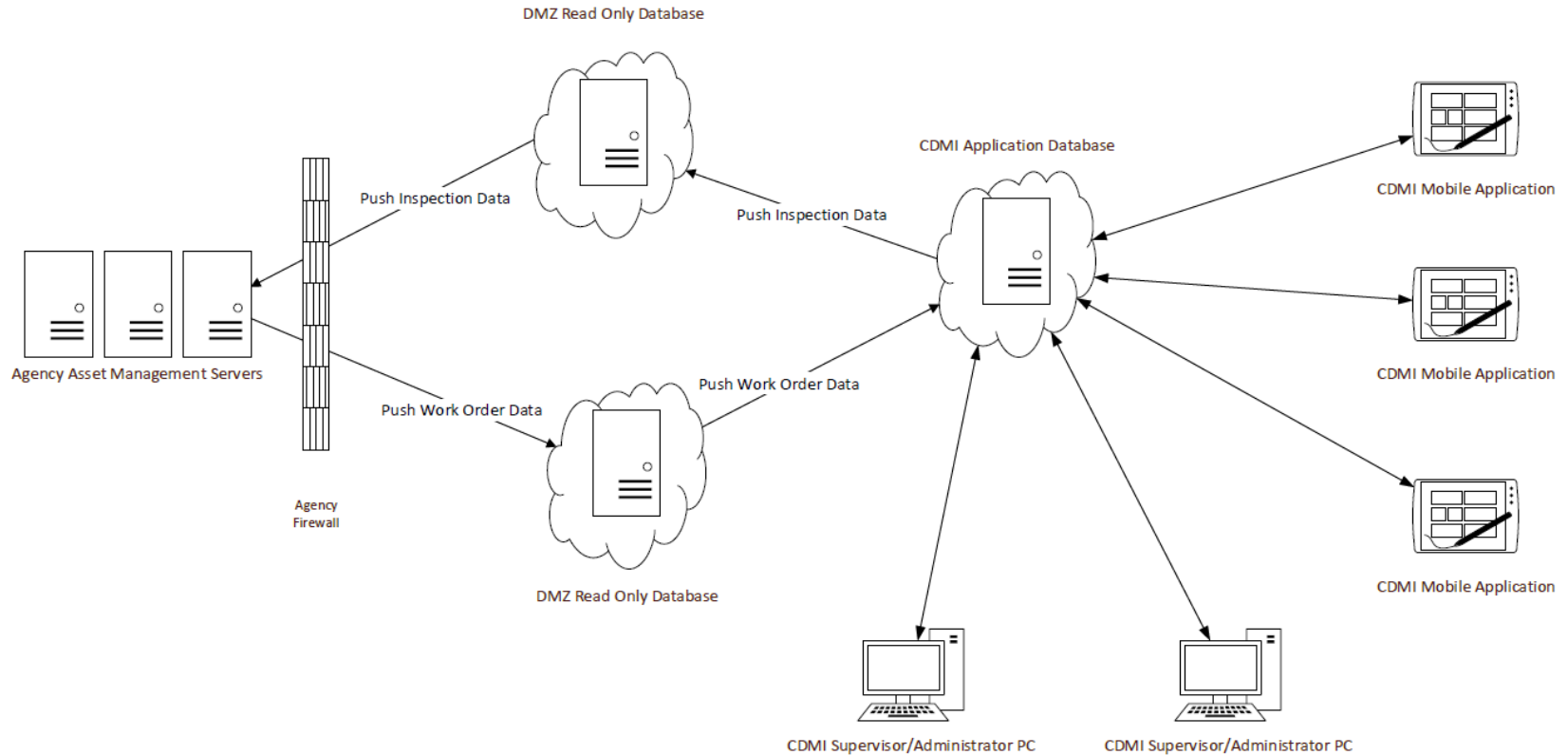
Employee # :

Supervisor name:

Detailed Inspection Report :

TRAIN NO	UNIT NO	INSPECTION TYPE	SYSTEM	COMPONENT	DEFECT	DEFECT STATUS	REPORTED BY	COMMENTS	REPORTED TIME
	8008	Brake Test	Parking Brake	Disk Brake	Emergency position on controller handle does not engage	Defect Reported	Steven Gonzalez		04/02/2018 at 6:00 pm.
	8009	Cab Signal Test	Visual Inspection	Cab signal equipment	EMI shield damaged or misaligned	Repaired	Christopher Mammano		04/02/2018 at 5:54 pm.
	8009	Cab Signal Test	Visual Inspection	Cab signal equipment	EMI shield damaged or misaligned	Defect Reported	Christopher Mammano		04/02/2018 at 5:54 pm.
	456	Brake Test	Emergency Brake Initiation	Master Controller	Emergency brake indicator on TOD not activated	Repaired	Steven Gonzalez		04/02/2018 at 5:31 pm.
	456	Brake Test	Emergency Brake Initiation	Master Controller	Emergency brake indicator on TOD not activated	Defect Reported	Steven Gonzalez		04/02/2018 at 5:27 pm.
	456	Brake Test	Parking Brake	Disk Brake	Emergency position on controller handle does not engage	Repaired	Steven Gonzalez		04/02/2018 at 5:26 pm.
	456	Brake Test	Parking Brake	Disk Brake	Emergency position on controller handle does not engage	Defect Reported	Steven Gonzalez		04/02/2018 at 4:01 pm.
	789	Daily Inspection	Exterior	Running Gear	Brakes Shoes worn/defective	Repaired	Christopher Mammano		04/02/2018 at 3:56 pm.
	789	Daily Inspection	Exterior	Running Gear	Brakes Shoes worn/defective	Repaired	Christopher Mammano		04/02/2018 at 3:56 pm.
	789	Daily Inspection	Exterior	Running Gear	Brakes Shoes worn/defective	Defect Reported	Christopher Mammano		04/02/2018 at 3:55 pm.

Utilize the Cloud – Interface with Asset Management



Implement

- Keep it simple – change is hard
- Start small – think big!
- Engage users – what's in it for them?

Opportunities

Same concept can be used for any asset inspection:

- Rail cars
- Locomotives
- Wayside equipment (signals, power, etc.)
- Track
- Transit buses
- Shop equipment
- Auditing and Quality Control

Questions



Thank You

Ken Mall

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