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Connected Vehicle Solutions

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INTERNET ON TRAINS – WHY ?

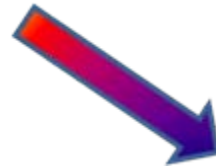
- Keep your customers - Enhance the value
- Sell more tickets - Attract new passengers from air, bus and car
- Make more money – Encourage upgrades
- Happier customers – Take away the sense of time



“The Wi-Fi is fantastic; I’m sitting here VPN’d into my corporate network and listening to MP3s streamed live from my home computer at the same time.”

A. Shutt

Standard Class Passenger, NXEC



**Convert travel
time to working
time**



**Efficiency
Flexibility
Productivity**



Entertaining Hours

=

Short Hours

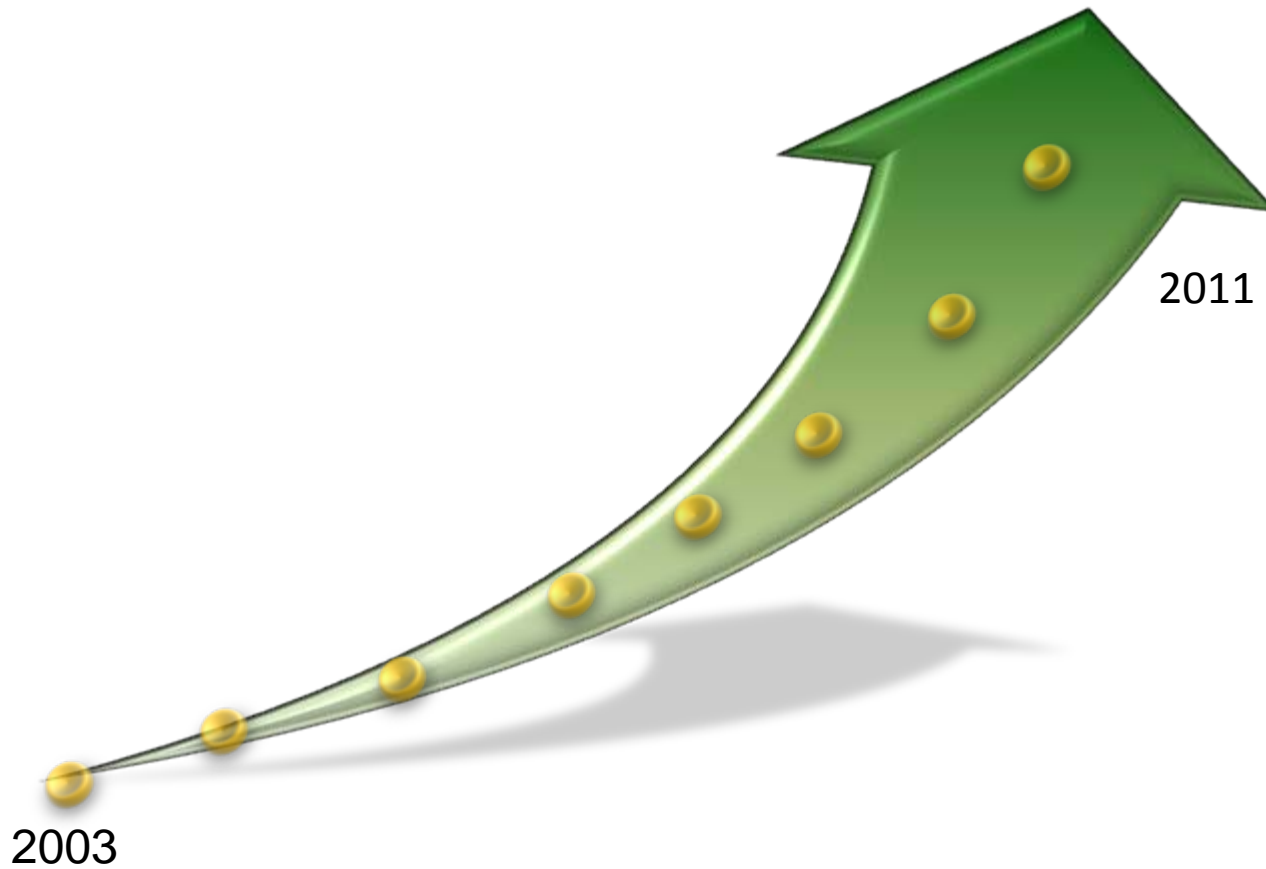


Apple iTunes



Usage of Wi-Fi for passengers

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When there are two competing lines (bus and rail) and one of the lines introduce internet for passengers there is typically a migration of 15-20% of the passengers to the line offering internet.

In most cases internet access is offered for free in buses and for first class rail customers. Second class typically pay for the service.

One of Icomeras customers charges for internet in second class, this pays for the whole investment and data fees.

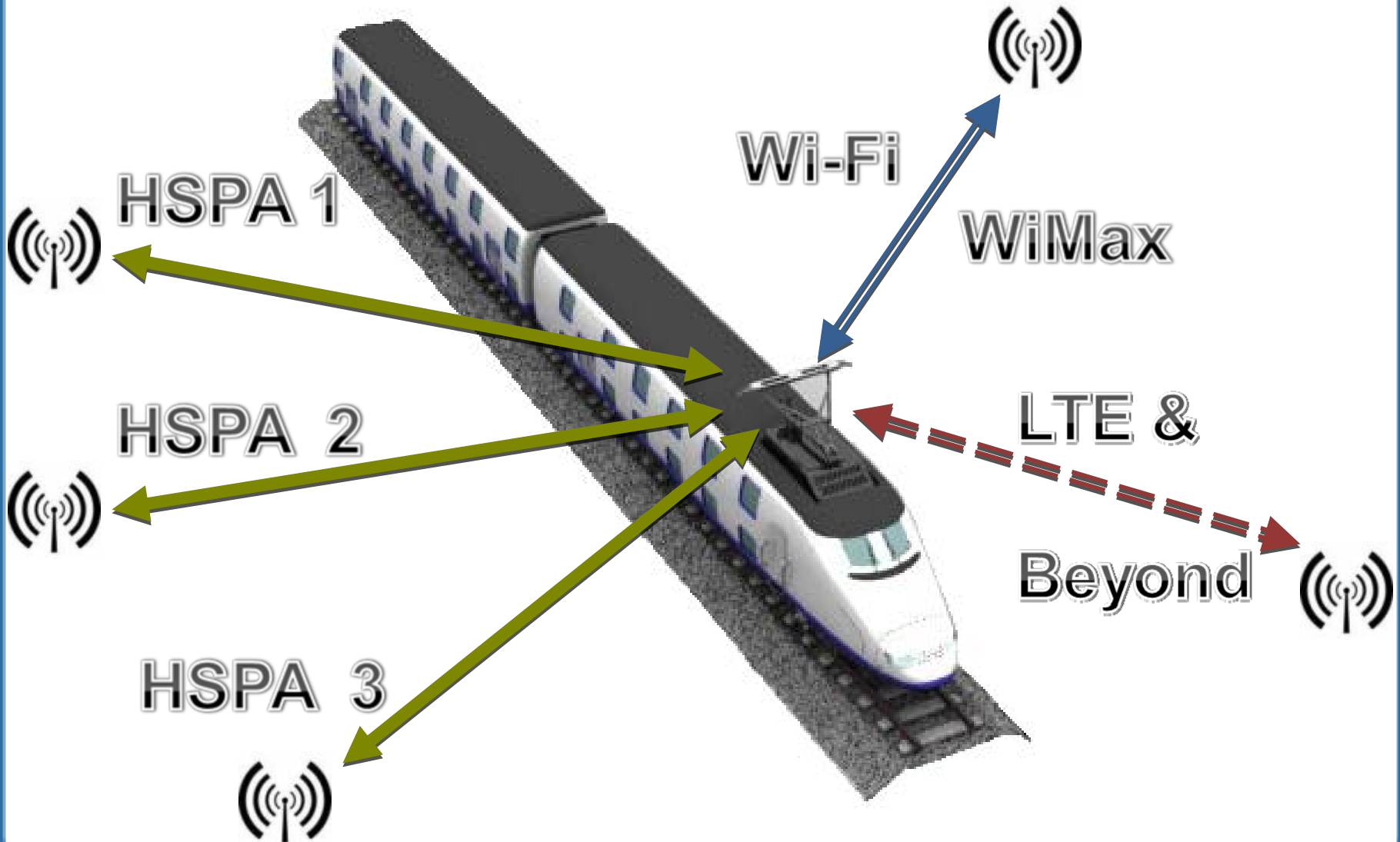
- Assuming that the second class paying passengers generate 5 million in revenue.
- This generates another 15 million in revenue from passengers migrating from second class to first class.
- This generates another 80 million in revenue from passengers migrating from other means of transportation to rail.
- This means that 5 million in cost generates 100 million in revenue, a 20 to 1 return on investment every year.

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INTERNET ON TRAINS – HOW ?

Technology – Combining Technologies

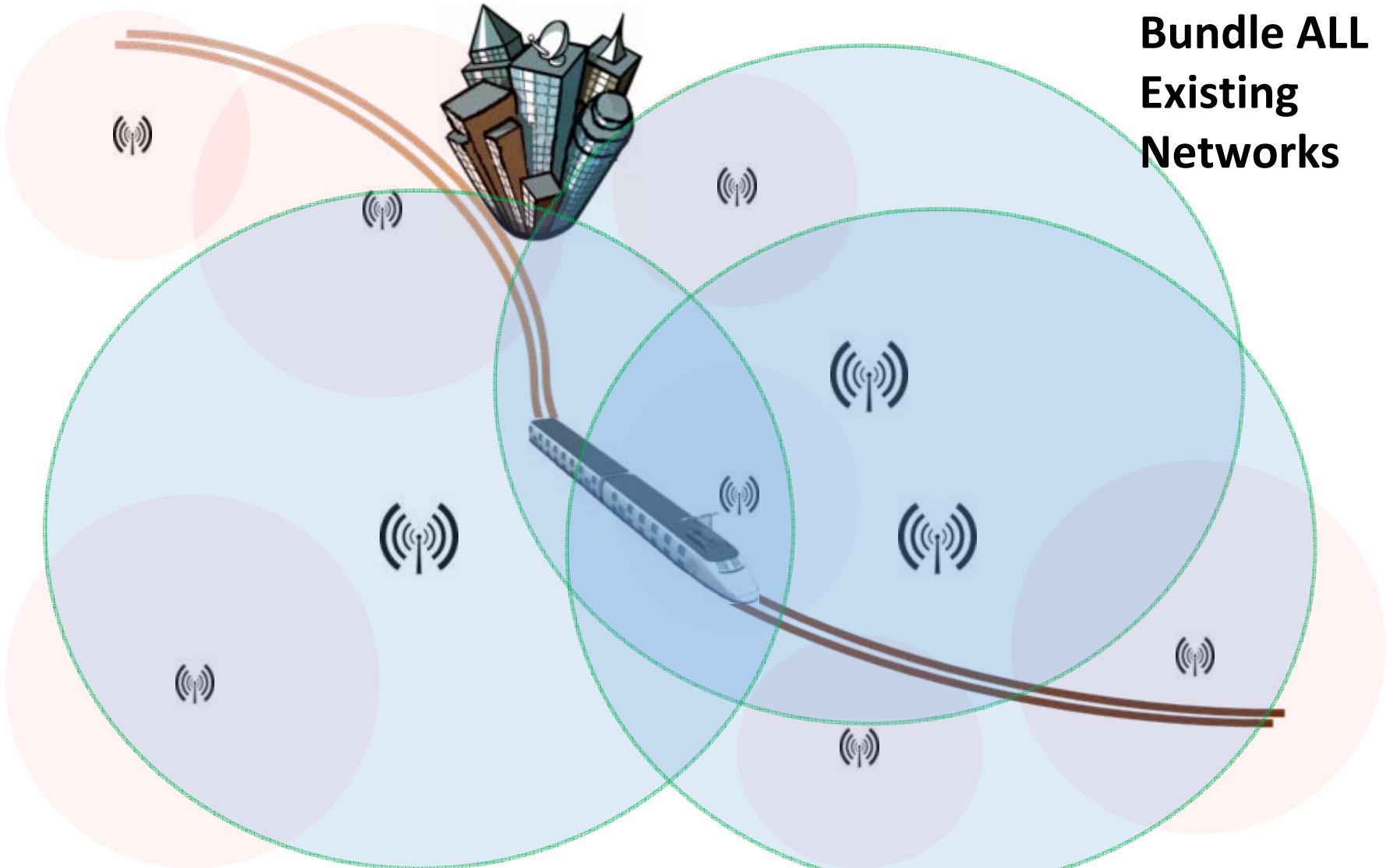
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Technology – Combining Networks

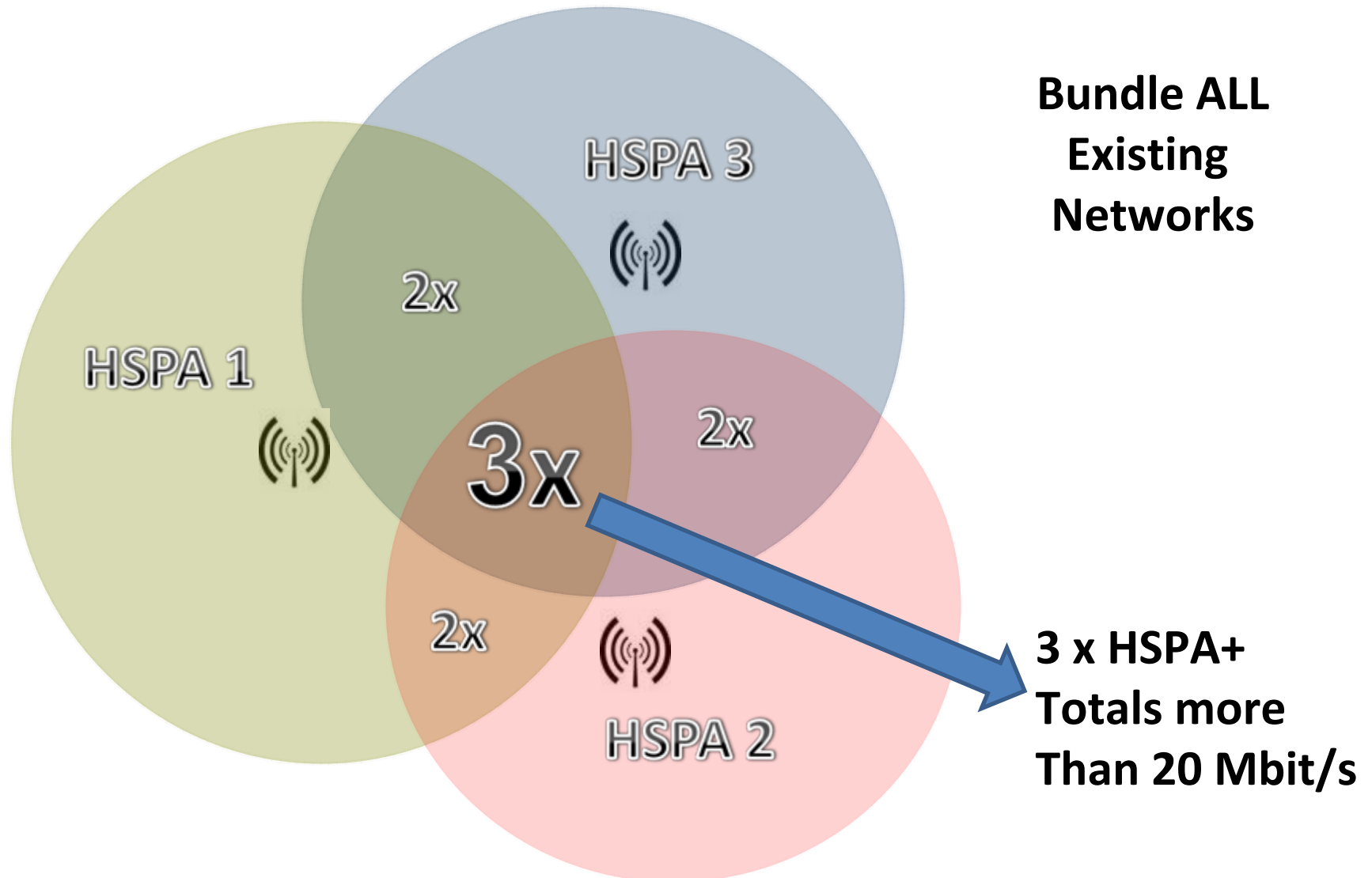
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**Bundle ALL
Existing
Networks**



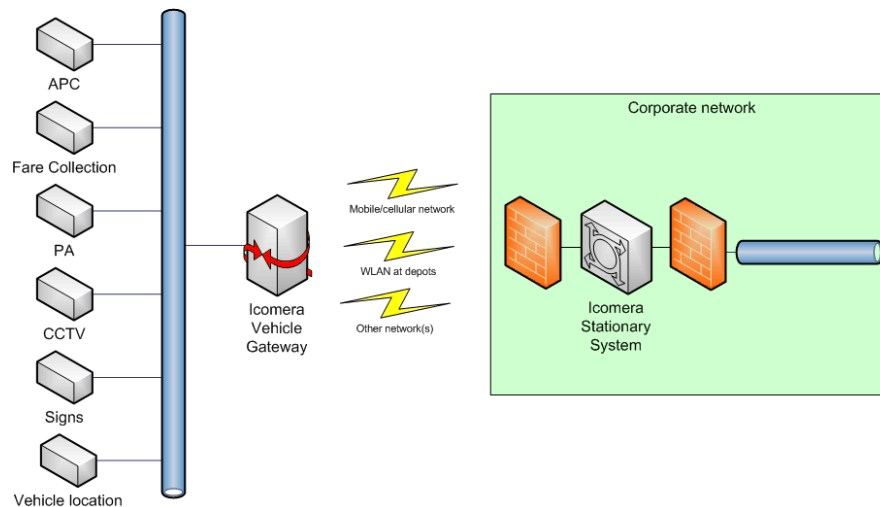
Technology – Combining Operators

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ON TRAIN

- One router per train is needed.
- Multiple antennas on the roof, depending on technology.
- Access point and switches.
- Communication between cars



OFF TRAIN

- Data subscriptions
- Private networks
- Central server
- Services

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INTERNET ON TRAINS – WHAT ?

Onboard Coverage:

Connected
Passenger



Onboard Coverage:

Connected
Staff



Connected
Fleet



Signs



Screens



Linje	Destinations	Nästa	Differens
7	Bergsjön	3	11
7	Tynnered	11	23
16	Eketrögatan	2	12
16	Högsbohöjd	6	18

GPS



Voice Over

Application: Connected Staff

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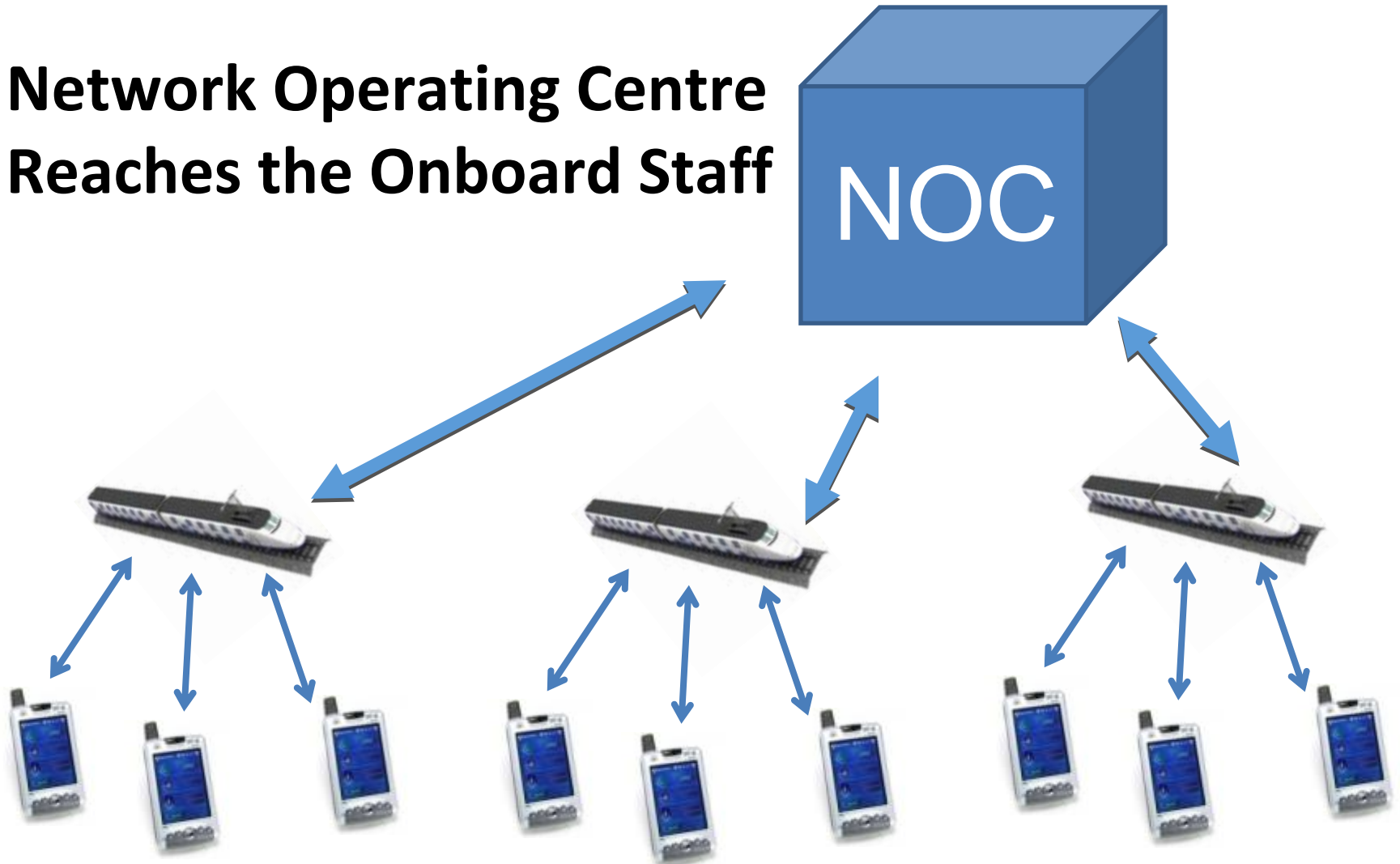


**19th Century
Communication
≠
21st Century
Transportation**

**Get your staff
connected - Now**



Network Operating Centre Reaches the Onboard Staff



Relevant & Updated Information

Delays & Transfers

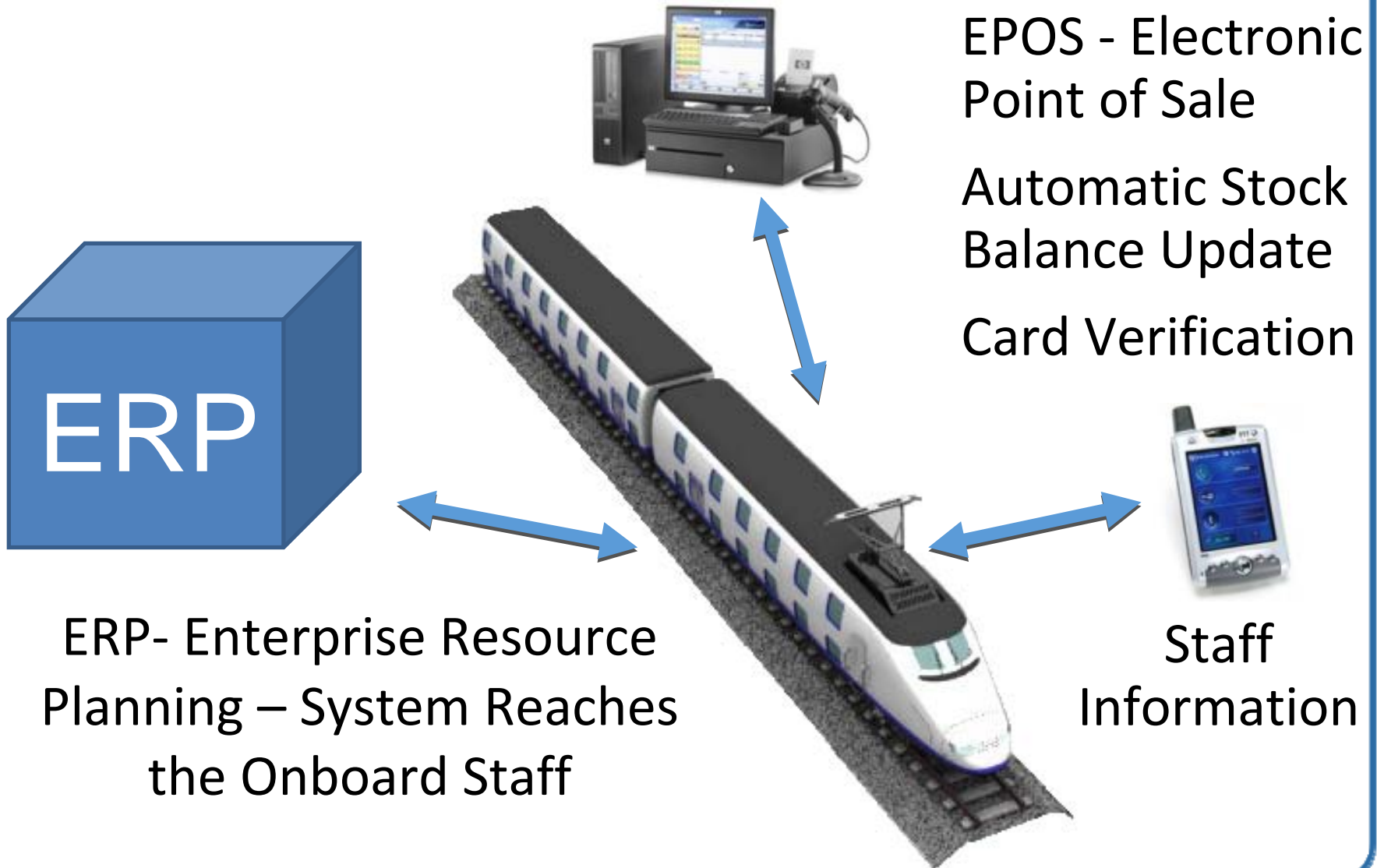
Route	Depart	Arrive	Duration	Interchanges
1	15:15	16:36	01:21	Icons: Person, Underground, Person, Bus, Person
2	15:26	16:41	01:15	Icons: Person, Bus, Person, Bus, Person, Bus, Person
Problems are currently reported on this route				
3	15:36	16:56	01:20	Icons: Person, Underground, Person, Bus, Person
4	15:40	17:01	01:21	Icons: Person, Bus, Person, Bus, Person, Bus, Person
Problems are currently reported on this route				

Passenger Lists



Application: Connected Staff

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**Offline =
10 % Fee**

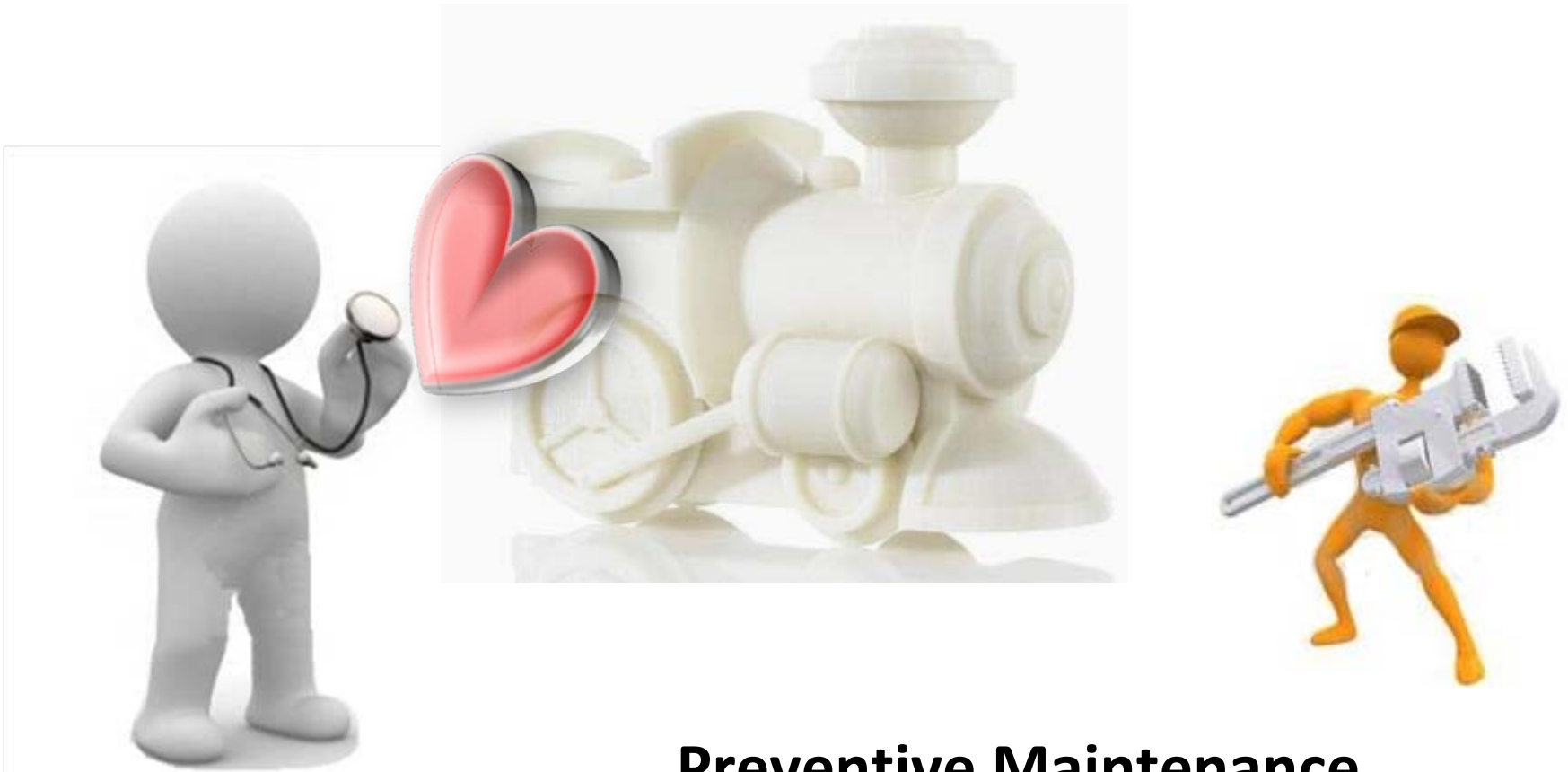


Direct Payment Verification

**Online =
2 % Fee**

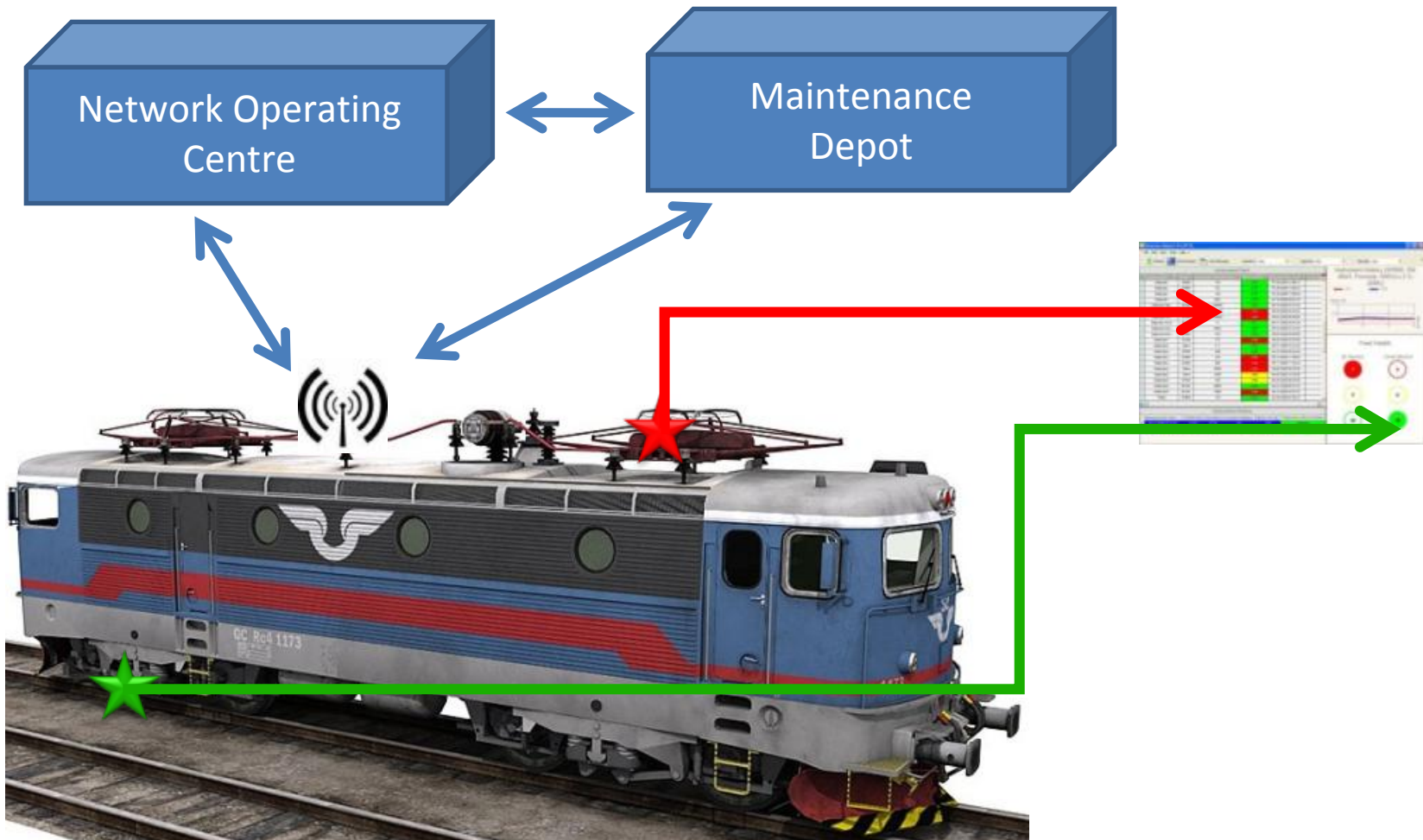


Vehicle Health Monitoring



Preventive Maintenance

Live Diagnostics from onboard sensors



Application: Connected Fleet



Full Fleet – Real Time Monitoring and History Logs

- Position Coordinates
- Maps
- Velocities
- Vehicle Condition
- Mission Data

The screenshot shows the MoovManage dashboard with the following sections:

- Account:** Account ID: stagecoach, Logged in as: admin, Activation Date: 2008-03-01, Renewal Date: 2009-02-28. Subscription due for renewal in 110 days.
- Devices:** Server Time 18:05 GMT 08/11/10, 19 devices online, 7 devices offline, 31 users online.
- Wi-Fi Users (Last 7 Days):** A bar chart showing user counts for Tue, Wed, Thu, Fri, Sat, Sun, and Mon.
- Live GPS Tracking:** A map showing the locations of 19 online devices with green location pins.

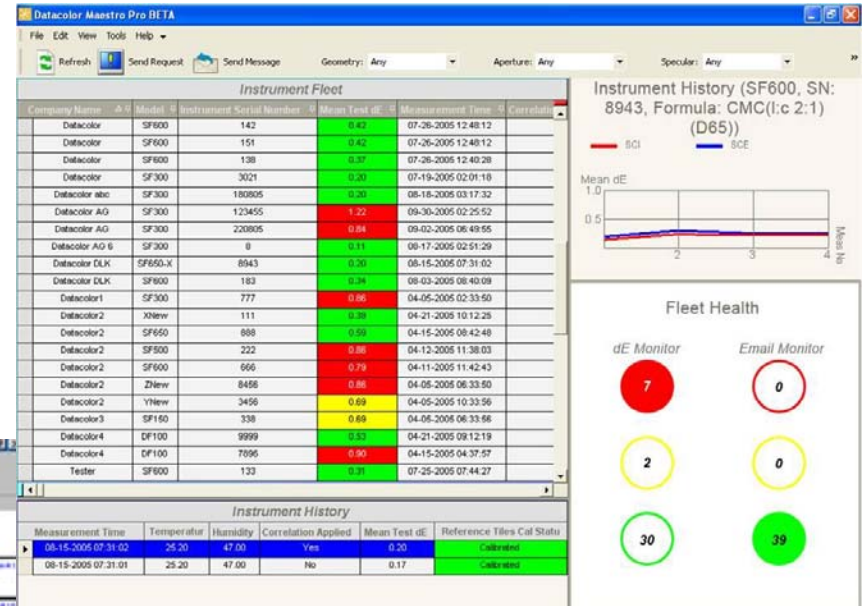
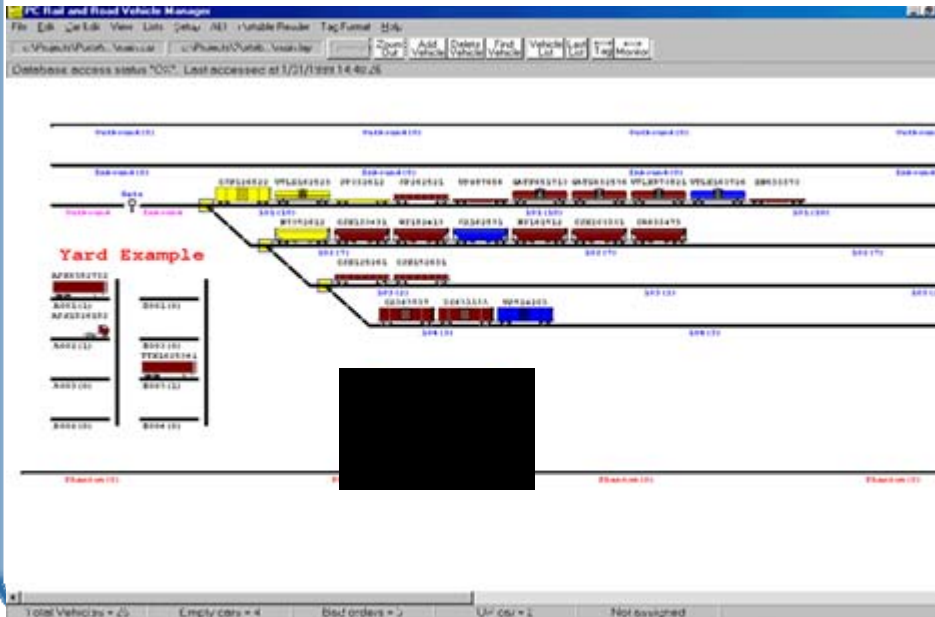
The Device List table shows the following data:

Status	Name	Uptime	Last Contact	Users	WAN	Signal	Mode	Firmware	actions
●	50102	0d 01:39:37	2009-02-10 14:58:59	1	1	-81 dBm	HSPA	1.7.0-C2	details edit map configure
●	50103	0d 02:31:07	2009-02-10 14:59:17	0	1	-51 dBm	3G	1.7.0-C2	details edit map configure
●	50104	0d 01:54:58	2009-02-10 14:51:50	1	1	-111 dBm	HSPA	1.7.0-C2	details edit map configure
●	50108	0d 00:48:40	2009-02-10 14:58:00	2	1	-113 dBm	HSPA	1.7.0-C2	details edit map configure
●	50109	0d 03:43:54	2009-02-10 14:59:04	2	1	-73 dBm	HSPA	1.7.0-C2	details edit map configure
●	50110	0d 01:53:22	2009-02-10 14:59:06	1	1	-79 dBm	3G	1.7.0-C2	details edit map configure
●	50111	0d 00:20:53	2009-02-10 14:59:12	0	1	-55 dBm	3G	1.7.0-C2	details edit map configure
●	50112	0d 09:14:33	2009-02-10 14:53:56	1	1	-93 dBm	HSPA	1.7.0-C2	details edit map configure
●	50113	0d 03:28:30	2009-02-10 14:59:55	2	1	-79 dBm	3G	1.7.0-C2	details edit map configure
●	50114	0d 02:48:16	2009-02-10 14:59:33	1	1	-107 dBm	3G	1.7.0-C2	details edit map configure
●	50115	0d 00:01:49	2009-02-10 14:42:40	0	1	-65 dBm	3G	1.7.0-C2	details edit map configure
●	50116	0d 10:36:50	2009-02-10 14:59:45	0	1	-83 dBm	HSPA	1.7.0-C2	details edit map configure
●	20172	0d 00:07:48	2008-05-10 14:45:40	0	1	-62 dBm	3G	1.7.0-C3	details edit map configure
●	20174	0d 05:49:10	2008-05-10 14:28:33	1	1	-103 dBm	3G	1.7.0-C3	details edit map configure

Application: Connected Fleet



- Position
- Condition
- Mission



Application: CCTV

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CCTV – Real Time & Recording
Months of Searchable Video Logs

OFF board
Storage



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NEXT STEP – BUYING A SYSTEM

Key buying considerations

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- Buy an **open platform** for future expansion.
- Buy a system which is **technology agnostic** and can handle any networks.
- Make sure that there is **seamless handover** between all networks.

- Buy a system which is specifically **built for the rail environment**.
- Buy a system which uses existing **hardware standards** as much as possible, which also gives a clear upgrade path.
- Buy a system which has been designed with **long life components**.

- Buy a system which offers a **range of applications** in other areas to get multiple benefits from the system.
- Buy a system where also different **service and support** levels are offered.
- Buy a system from a supplier with **superior knowledge in RF** and antennas since bad RF installation can dramatically reduce performance.

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Connected Vehicle Solutions