

# Software for Traffic Information and Management



**Keeping Travelers Moving Worldwide**

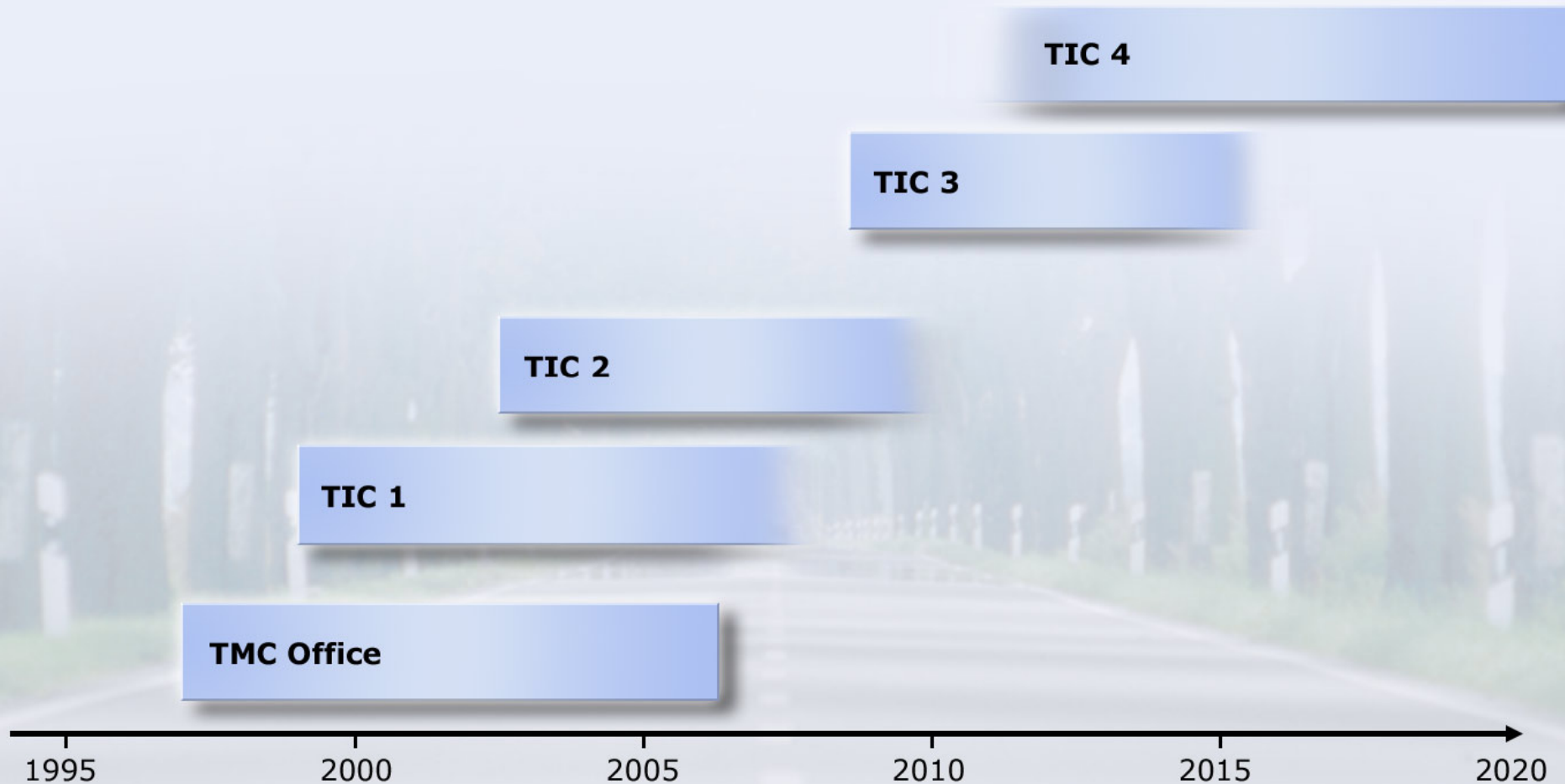
## **TIC Smart Client For PDA California 511 Workshop 10/28/08**

- 1987** - Metro Traffic Control - Sacramento  
Director of Operations
  - Directed all local traffic operations
  
- 1988** - Metro Traffic Control - Houston  
VP Operations - Western USA
  - Responsible for Western US Traffic Ops.
  
- 1995** - Metro Traffic Control - Houston  
VP Product Development
  - Developed WebTraffic Product - TeleAtlas
  - Developed RealTraffic Product - MapTuit
  - Worked on WON/SRS public sector projects
  
- 2003** - SmartRoute Systems - Houston/Boston  
VP/General Manager
  - Oversight on Various 511 Systems
    - South Florida
    - VDOT, NCDOT, NJDOT
  - Boston SmarTraveler Project

Member of 511 Deployment Coalition

- ◆ **Name** GEWI
- ◆ **Location** Germany, Bernburg
- ◆ **Founded** 1992
- ◆ **Directors** Hagen Geppert  
Karl Will
- ◆ **Resources** 20
- ◆ **Certified** ISO 9001:2000  
annually since 1998.
- ◆ **Business areas** Consumer electronics  
Traffic telematics
- ◆ **Company structure** GEWI Engineering GmbH  
GEWI Hard- und Software Entwicklungsgesellschaft mbH





◆ **TIC Executable Code for Windows.**

- Software platform for processing data such as traffic on Windows PC's.

◆ **TIC Compact Executable Code for Windows**

- Software platform for processing data such as traffic on PDA's, PND's, and mobile phones.

◆ **TIC FM Radio G313**

- Hardware for receiving RDS (FM Subcarrier Radio Data Systems) data off-air.

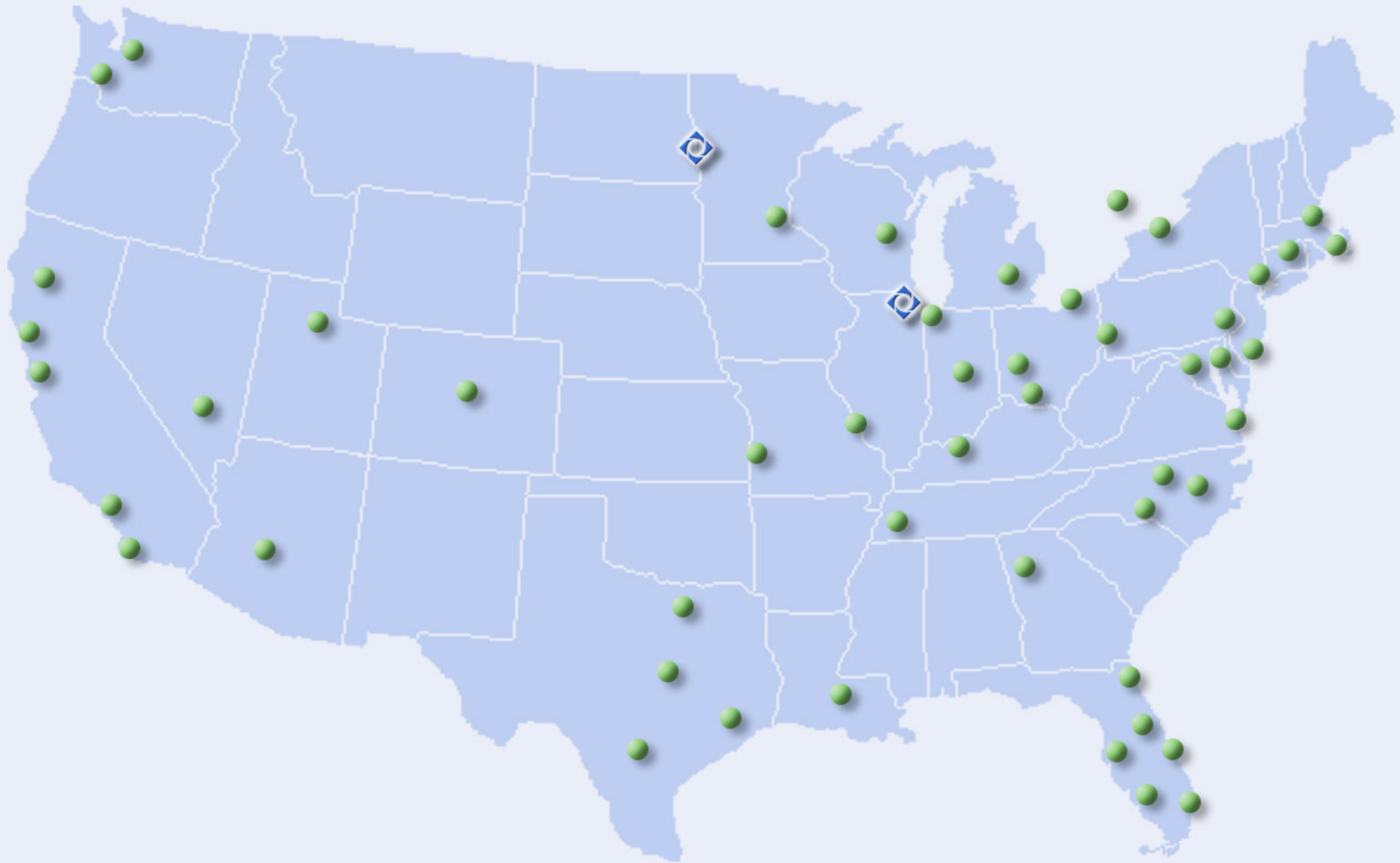
◆ **TIC DAB Radio G311.**

- Hardware for receiving DAB (Digital Audio Broadcasting) data off-air.

- ◆ **Government agencies such as police and DOT's.**
  - European Road Information Center (ERIC) runs on TIC
    - (22 countries in 7 languages)
  - SouthWest Florida 511
- ◆ **Commercial service providers.**
  - NAVTEQ/Traffic.com
- ◆ **Radio stations.**
- ◆ **Automobile clubs.**
- ◆ **Road operators.**
- ◆ **Car and navigation device manufacturers.**
  - BMW USA
  - Daimler/Chrysler











**PROJECT START:** 2003

**PROJECT MISSION:** The main purpose of the system is to aggregate high quality traffic information sources from the main US markets into one system such that these can be distributed to business customers.

**DATA INPUT:** The TIC Software consists of multiple TIC Servers which receive from multiple data sources from across the USA, including from traffic event databases and road sensors, from both government and commercial organizations. The TIC NAVTEQ installation is continuously receiving and processing over 20,000 sensors collected from many cities across the USA including metropolitan areas such as Chicago, Detroit, New York, Houston, Los Angeles, Philadelphia, and San Francisco.

**CURRENT OPERATIONS:** , NAVTEQ's TIC Server in Chicago supplies live location and event coded data for two commercial US satellite service providers (XM and Sirius) for navigation receivers in twenty markets across the USA for use in vehicles manufactured by companies such as Cadillac and Honda.

**TECHNICAL CONFIGURATION:**

Two complete sets of TIC Servers are installed, one in a primary location in one city and another in a secondary location in a second city. Automatic failover mechanisms switch from the primary to secondary sites with a few minutes.

511

**SOUTHWEST FLORIDA 511**

**KNOW BEFORE YOU GO**

A Free Service of FDOT

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Weather

**Port Charlotte**

Overcast  
75 F (24 C)

**Ft. Myers**

Light Rain  
72 F (22 C)

**Naples**

Light Rain  
73 F (23 C)

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Filter Events

- Incident
- Roadwork
- Adverse Weather
- Information

Map and Traffic Information Display

24 mi

TIC Powered by NAVTEO ON BOARD

Current Events

Highlight Highway:  
All

- 09/29/2008 4:29AM**

Type: Roadwork

Location: **I-75 SOUTHBOUND AND NORTHBOUND**

Description: between junction CR-951/EXIT 101 and junction SR-884/EXIT 136 in both directions road construction during the day time, delays possible

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- 09/26/2008 5:33PM**

Type: Roadwork

Location: **SR-82 EASTBOUND AND WESTBOUND**

Description: between cross-road SR-29 and cross-road CR-850/CORKSCREW RD in both directions paving operations during the night, intermittent short term closures, expect slow traffic

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- 09/30/2008 3:44PM**

Type: Incident

Location: **US-41 N CLEVELAND AVE: NORTHBOUND AND SOUTHBOUND**

Description: cross-road CR-78A/PONDELLA RD in both directions accident

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- 09/26/2008 5:32PM**

Type: Roadwork

Location: **SR-80 PALM BEACH BLVD: EASTBOUND AND WESTBOUND**

[Website Help](#) | [511 FAQ](#) | [Contact Us](#) | [Terms of Service](#)

# SWFLA 511 Project Detail



<b>End-user organization</b>	Florida Department of Transport (DOT) District One, in South West Florida, 801 N. Broadway Ave., P.O. Box 1249, Bartow, FL, 33831-1249, USA
<b>Used for</b>	US DOT 511 service.
<b>Project description</b>	<ul style="list-style-type: none"><li>• Collect travel time data.</li><li>• Manually create traffic event data.</li><li>• Distribute travel time and traffic event data to a 511 IVR and website.</li></ul>
<b>Geographical coverage</b>	South-West Florida
<b>Project period</b>	<ul style="list-style-type: none"><li>• Project started: 01.01.2006.</li><li>• Operation started: 01.07.2007.</li></ul>
<b>Product generation Customer</b>	TIC Executable Code for Windows (TIC2). Post, Buckley, Schuh & Jernigan, Inc., 2001 NW 107 Avenue,

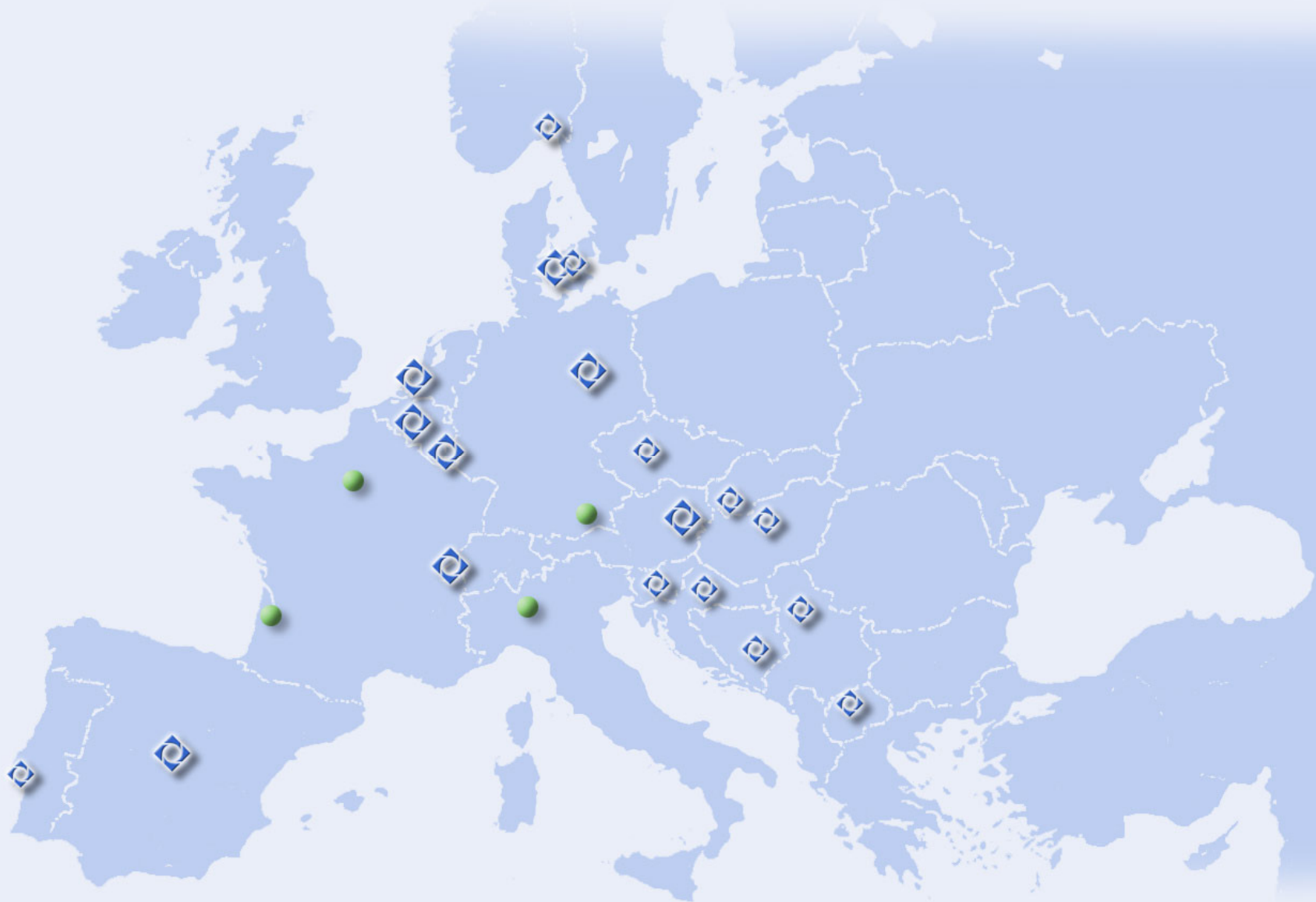


## **Project Mission:** Navigation Testing

Both BMW USA and Daimler Chrysler use GEWI in labs to test their Navigation Systems. Labs create incidents, check alternative routes, proper incident display characteristics.

NOTE: In Europe, 15-20 million Navigation Systems are in use. This allows DOT's to use the Nav System as part of traffic management. DOT's can notify driver (by system type) and include DOT preferred diversion.





## About ERIC:

- 22 organizations in 22 European countries.
- Coverage of more than 80% of European roads.
- More than 450 million European people represented.
- More than 100,000 travel messages per month distributed.
- Headquarters and central communication in Geneva, connected to all member info centers.
- Provides real-time exchange between the organizations.
- Fully automated with the ERIC 3000 system as provided by GEWI.
- Traffic information gathered/distributed in 7 different languages.

**The ERIC 3000 system consists of a central TIC Server that connects the member organizations. The ERIC 3000 system operates according to European standards for coded information exchange like DATEX or RDS-TMC:**

- Localization coding with geographical data-base support (RDS-TMC location and event coding).
- Standalone- or network – solution for members.
- Subscription and filter facilities (to receive only information needed).
- First-line support via ERIC operational Management.
- Second-line support via GEWI in Bernburg.
- The ERIC 3000-system enables connection with various in-house systems.
- ERIC 3000 is DATEX and RDS-TMC compliant.





<b>End-user organization</b>	City of Zurich, Switzerland.
<b>Used for</b>	See <a href="http://www.zuerittraffic.ch/">http://www.zuerittraffic.ch/</a> .
<b>Project description</b>	<ul style="list-style-type: none"><li>• Collect data from 1.000 road sensors (traffic lights) and taxi fleet.</li><li>• Compute level of service including spatial completion and short-term forecast.</li><li>• Show live traffic flow including forecast on a map for the website.</li></ul>
<b>Geographical coverage</b>	City of Zurich.
<b>Project period</b>	<ul style="list-style-type: none"><li>• Project started: 01.07.2000</li><li>• Operation started: 01.07.2001</li></ul>
<b>Product</b>	POLYDROM.

# Zurich Traffic Flow - Current



Stadt Zürich  
Dienstabteilung Verkehr

Polizeidepartement



# Zurich Traffic Flow - 30 Minute Forecast



Stadt Zürich  
Dienstabteilung Verkehr

Polizeidepartement





# Zurich Traffic Flow - 60 Minute Forecast



Stadt Zürich  
Dienstabteilung Verkehr

Polizeidepartement



## Project Details:

<b>End-user organization</b>	Danish Road Directorate, Niels Juels Gade 13, 1022 Copenhagen K, Denmark
<b>Used for</b>	Traffic information, RDS-TMC service.
<b>Project description</b>	<ul style="list-style-type: none"><li>• Collect traffic event data from multiple systems.</li><li>• Manually create traffic event data.</li><li>• Distribute traffic event data to multiple systems.</li><li>• RDS-TMC Broadcast.</li></ul>
<b>Geographical coverage</b>	Denmark
<b>Project period</b>	<ul style="list-style-type: none"><li>• Project started: 01.05.06.</li><li>• Operation started: 01.09.06.</li></ul>
<b>Product generation</b>	TIC Executable Code for Windows (TIC2).
<b>Customer organization</b>	Danish Road Directorate, Niels Juels Gade 13, 1022 Copenhagen K, Denmark

- ◆ **Off-the-shelf**      One core product.
- ◆ **Independence**      User configurable.  
Custom components.  
Custom features.
- ◆ **Scalable**      System architecture.  
Licensing.
- ◆ **Deployment**      Fast and easy to install and learn.  
Full documentation.
- ◆ **Supported**      24 x 7.
- ◆ **Maintained**      New and improved features available regularly.
- ◆ **Reliable**      Fourth generation since 1997.
- ◆ **Accepted**      Over 70 projects operating worldwide.

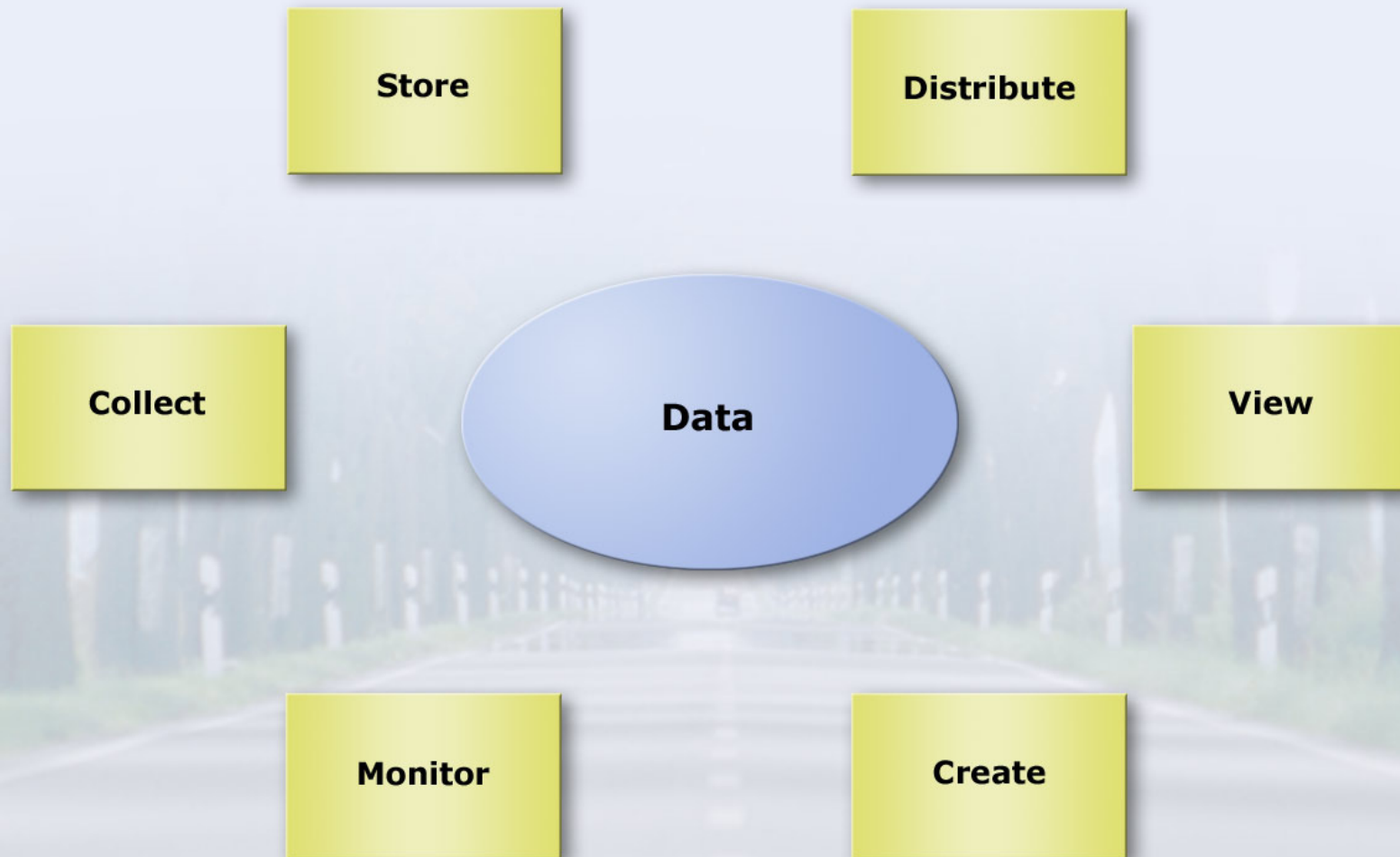


◆ **World Class Features**

- PDA Incident Entry / Commuter Traffic Alerts.
- Traffic Forecasting.
- Spatial Completion
- Conforms to all current data standards. (and future in Dev)
- Universal Camera Remote Control.
- Automatically generate incidents based on traffic flow
  - Virtual 24/7 Operations

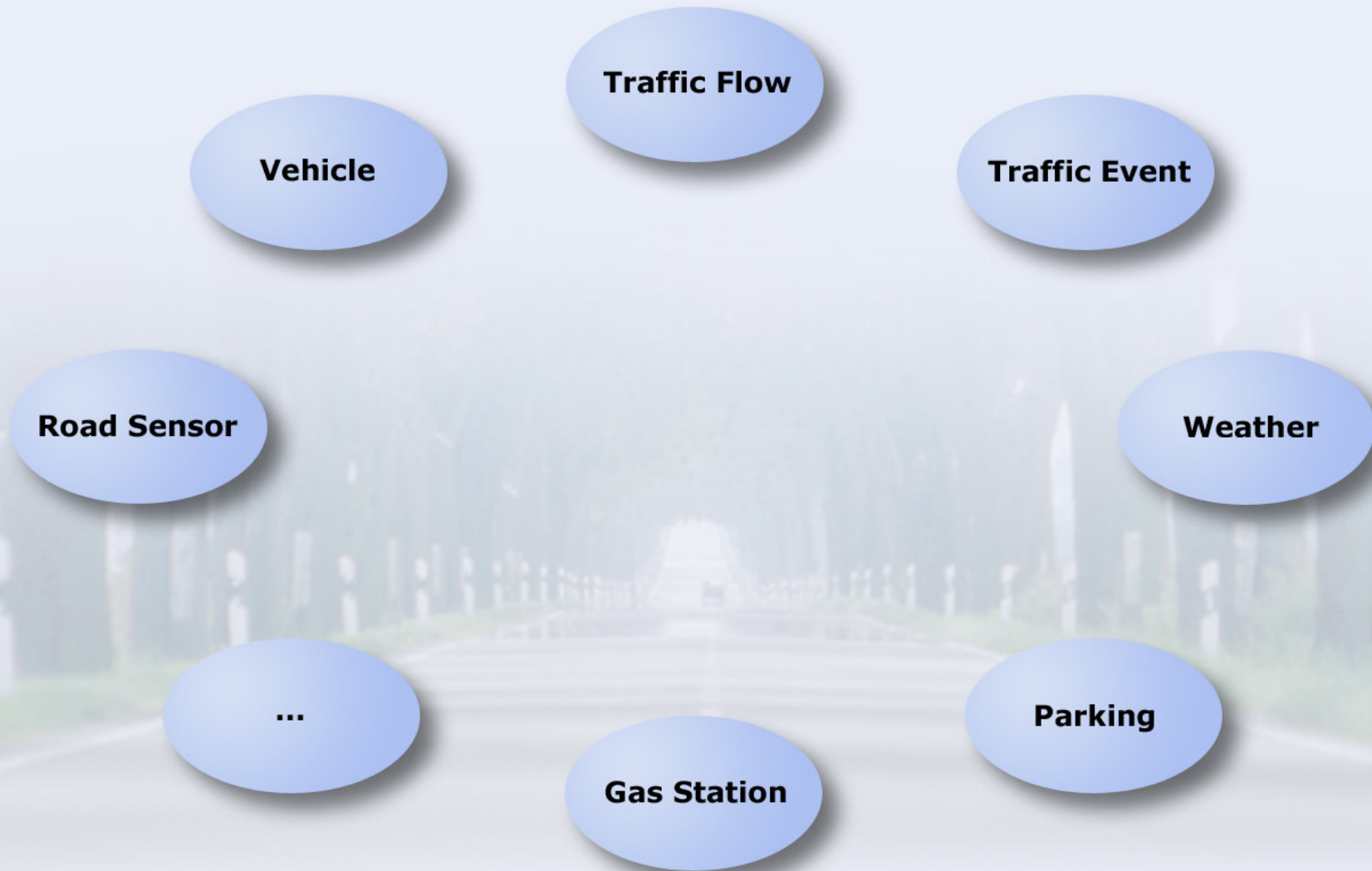
◆ **Easy To Deploy**

- No change to current systems. GEWI sits "on top" of existing system.
- Works with ANY data type.
- Can output to ANY Web or IVR service.
- Works with any contractor / subcontractor systems.
- Easy to replace existing systems when their useful life has ended.



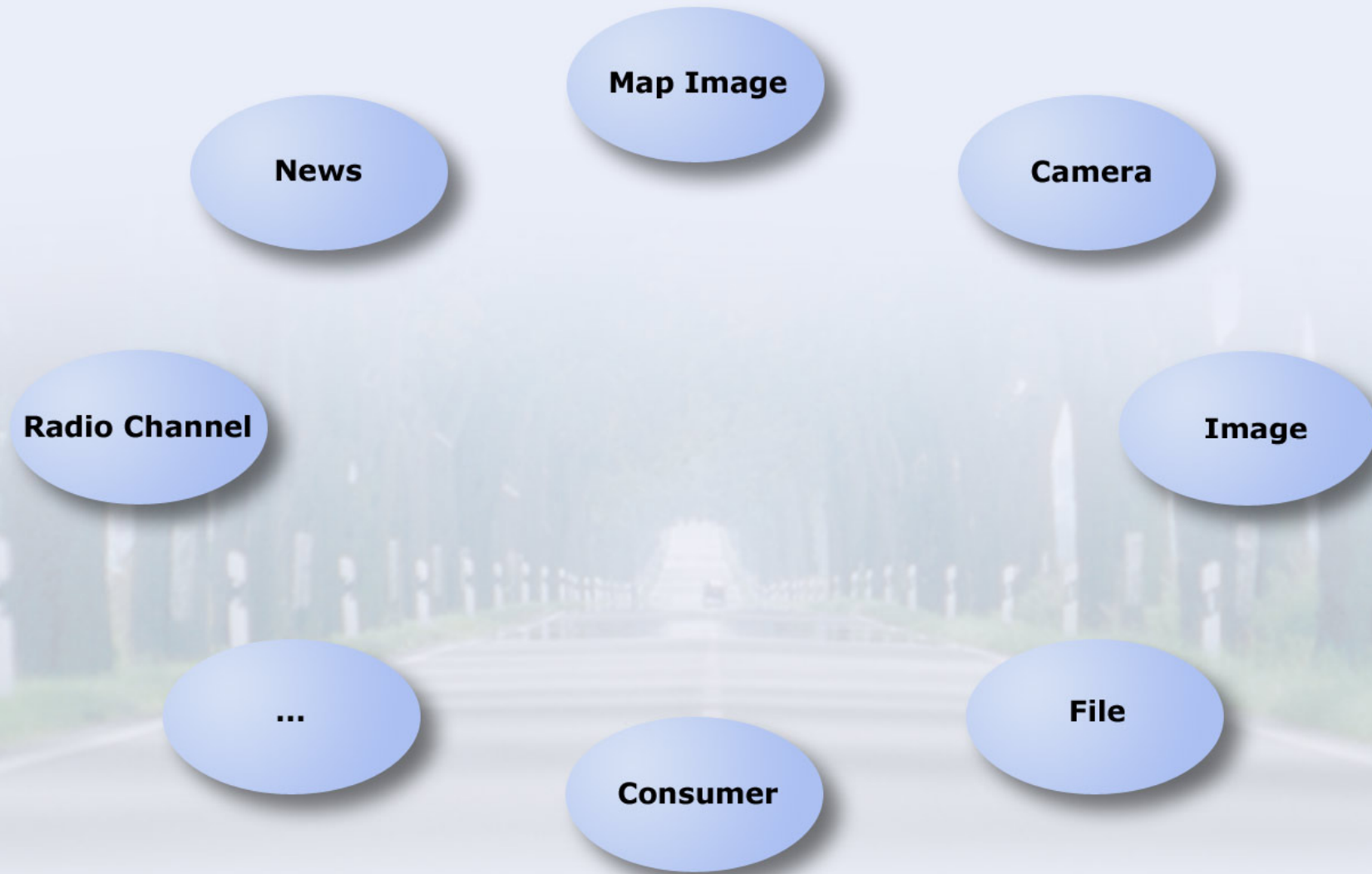
# Main features

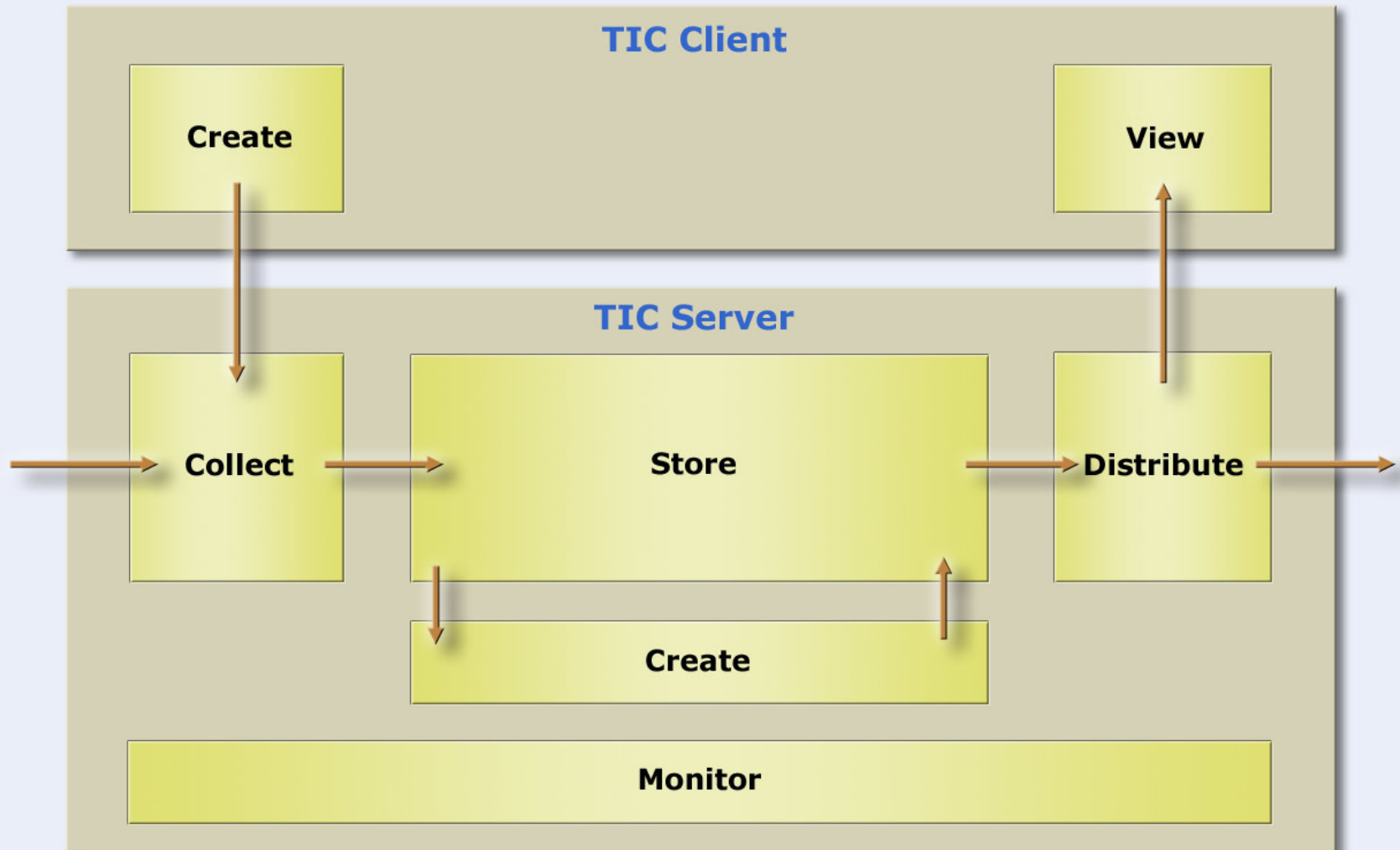
## Data types



# Main features

## Data types





## Uses & Benefits

- Provides the user the ability to create and distribute traffic information via mobile device.
- Utilize existing, affordable hardware.
- Precisely locate the incident (accident)
- Precisely locate begin and end of a work zone, especially in moving work zone ex. Grass cutting
- PDA user has access to all live information.
- Can be used by police & government workers to enter traffic event data using a simple interface.





Test project currently underway in a BMW Research project with the Bavarian State Police (similar to our State DPS)



TIC available in multiple languages including German, English & Spanish



- GPS enabled receiver
- Internet connection
- Microsoft Windows Mobile OS
- Touch Screen

1. Tap start
2. In the opening menu TIC tap mobile editor



Once the program loads, tap Login to enter your PIN number



# View Traffic Reports

All current reports are shown here in summary format.

Street name and street segment are shown.

The top menu bar shows that these are items 1-5 of 6 total, and the most recent report update time.

Tap on a message box for information on, or to change that specific traffic message.

Tap MORE to view the next page of messages



1 ... 5 / 6 14:48

A1 Rade Sittensen	A23 Heide-Süd Heide-West
A23 Itzehoe-Süd Elmshorn	A1 Lübeck Eutin
A23 Stör Itzehoe-Süd	mehr ...

Ausloggen Neu Ändern



1 ... 5 / 6 14:48

Organisation: DIWA  
Nummer: 172.1  
Erstellt: 14:46:02

A23 Zwischen AS Itzehoe-Süd  
und AS Elmshorn Stau, Unfall,  
Straßenglatte

Aufheben Abbrechen

Ausloggen Neu Ändern

Traffic Message Detail

1 ... 5 / 6 14:48

A1 Rade Sittensen	A23 Heide-Süd Heide-West
A23 Itzehoe-Süd Elmshorn	A1 Lübeck Eutin
A23 Stör Itzehoe-Süd	mehr ...

Ausloggen Neu Ändern

Tap NEW (Neu) to create a new traffic message.



# Creating a new event - Add Detail

Select event type



Select "wide area" or Start location



# Determine location

Koordinaten: 11,73256; 51,79884  
Genauigkeit:   
Länge in km: -

Lokalisierung:

Koordinaten: 11,73263; 51,79858  
Genauigkeit:   
Länge in km: -

Lokalisierung:

Start selected.....Localization is running

User can also select "counter - direction"  
to report events observed in the opposite direction of  
travel.

# Edit or confirm message

2,5		
1	2	3
4	5	6
7	8	9
	0	/
Abbrechen	Reset	OK

Edit extent Menu

A9 Between Hilpoltstein and Allersberg queue, approach with care, multi-vehicle accident		
Cancel	Back	Send

Confirm and send message

# Event Codes - Examples

## 4 Event Codes

The following table explains events which appear in the mobile TIC editor.

Icon	Ereignis	Erläuterung
	<b>Defektes Fahrzeug</b>	<b>Im Falle eines oder mehrerer liegendebliebener Fahrzeuge.</b>
	<b>Gegenstände auf der Fahrbahn</b>	<b>Im Falle, dass Gegenstände die Fahrt stören, die möglicherweise nicht ohne weiteres um- bzw. überfahren werden können.</b>
	Verlorene Ladung	
	Fahrzeugteile	
	Große Gegenstände	
	Umgestürzte Bäume	
	<b>Personen auf der Fahrbahn</b>	<b>Im Falle von Menschen auf der Fahrbahn.</b>
	Kinder	
	Radfahrer	
	<b>Tiere auf der Fahrbahn</b>	<b>Im Falle von Tieren auf der Fahrbahn.</b>
	Wild	
	Tierherde	
	Kleintiere	
	Großtiere	
	<b>Brandgefahr</b>	<b>Im Falle von erhöhtem Brandrisiko. Es sollten vor Ort keine brennenden oder brandauslösenden Mittel verwendet werden.</b>

	<b>Unfall</b>	<b>Im Falle eines Unfalls.</b>
	Mit mehreren Fahrzeugen	
	schwerer Unfall	
	mit Lkw	
	mit Bus	
	mit Gefahrguttransporter	
	ungesicherte Unfallstelle	
	<b>Gefährliches Stauende</b>	<b>Im Falle von akuter Auffahrunfallgefahr.</b>
	Plötzlich	
	hinter Kuppe	
	hinter Kurve	
	im Tunnel	
	<b>Schaulustige</b>	<b>Im Falle, dass z. B. Schaulustige einen Unfall auf der Gegenfahrbahn beobachten, aber auch an Stellen wo Attraktionen am Straßenrand zum abbremsen verleiten.</b>
	<b>Schwertransport</b>	<b>Schwertransporte (ohne Überbreite) mit langsamer Fahrt.</b>
	<b>Herannahendes Einsatzfahrzeug; Gasse bilden!</b>	<b>Im Falle, dass sich ein Rettungsfahrzeug etc. von hinten nähert.</b>
	<b>Wanderbaustelle</b>	<b>Behindert den Verkehrsfluss und kann sich bewegen.</b>
	<b>Falschfahrer (Geisterfahrer)</b>	<b>Im Falle von Fahrzeugen die in falscher Richtung fahren (nicht stehen).</b>

# Event Codes - Standards

Event codes can be any subset of:

TMC

Worldwide, based on ALERT-C

SAE

USA, based on TMC

	<b>Reduzierte Sichtweite</b>	<b>Falls Wettereinflüsse die Sicht gefährlich vermindern.</b>
	durch Nebel	
	durch Rauch	
	durch starken Schneefall	
	durch Hagel	
	durch tiefstehende Sonne	

	<b>Niederschlag</b>	<b>Starker Niederschlag, der eine deutliche Reduzierung der Geschwindigkeit erfordert.</b>
	starker Regen	
	starker Schneefall	

	<b>Rücksichtslose Kraftfahrer</b>	<b>Im Falle von Kraftfahrern, von denen eine Gefährdung des nachfolgenden Verkehrs ausgehen kann.</b>
	Steinwerfer	
	Rücksichtslose Fahrer	

	<b>Straßenglätte</b>	<b>Im Falle von Rutschgefahr.</b>
	Verschmutzte Fahrbahn	
	Schneeglätte	
	Eisglätte	
	Überfrierende Nässe	
	Ölspur	
	Rollsplitt	

	<b>Aquaplaning</b>	<b>Im Falle gefährlich hoher Wasserfilmdicke auf der Fahrbahn, die zu einem plötzlichen Verlust des Fahrbahnkontakts führen kann.</b>

	<b>Extreme Wetterverhältnisse</b>	<b>Extreme Wetterbedingungen, Fahrweise ist dringend anzupassen.</b>
	Starker Wind	Bei gefährlichem Seitenwind.
	Zerstörender Hagel	

	<b>Gefährliche Fahrbahnverhältnisse</b>	<b>Im Falle, dass natürliche Geschehnisse das Fahren mit erhöhter Vorsicht erfordern. Der Grund tritt während der Fahrt plötzlich auf.</b>
	Steinschlag (linienhafte Lokalisierung)	
	Unterspülung der Fahrbahn	
	Absenkung der Fahrbahn	
	Schneeverwehungen	
	Sturmschäden	

# TIC System Architecture

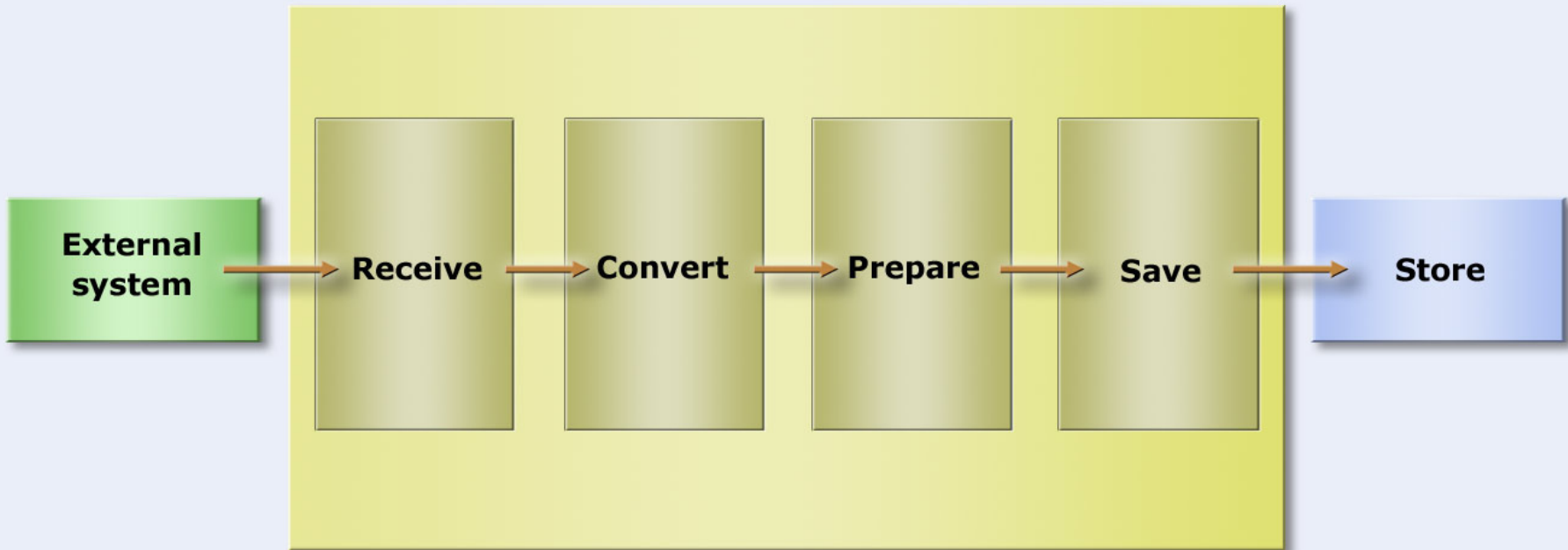
◆ **Consists of components:**

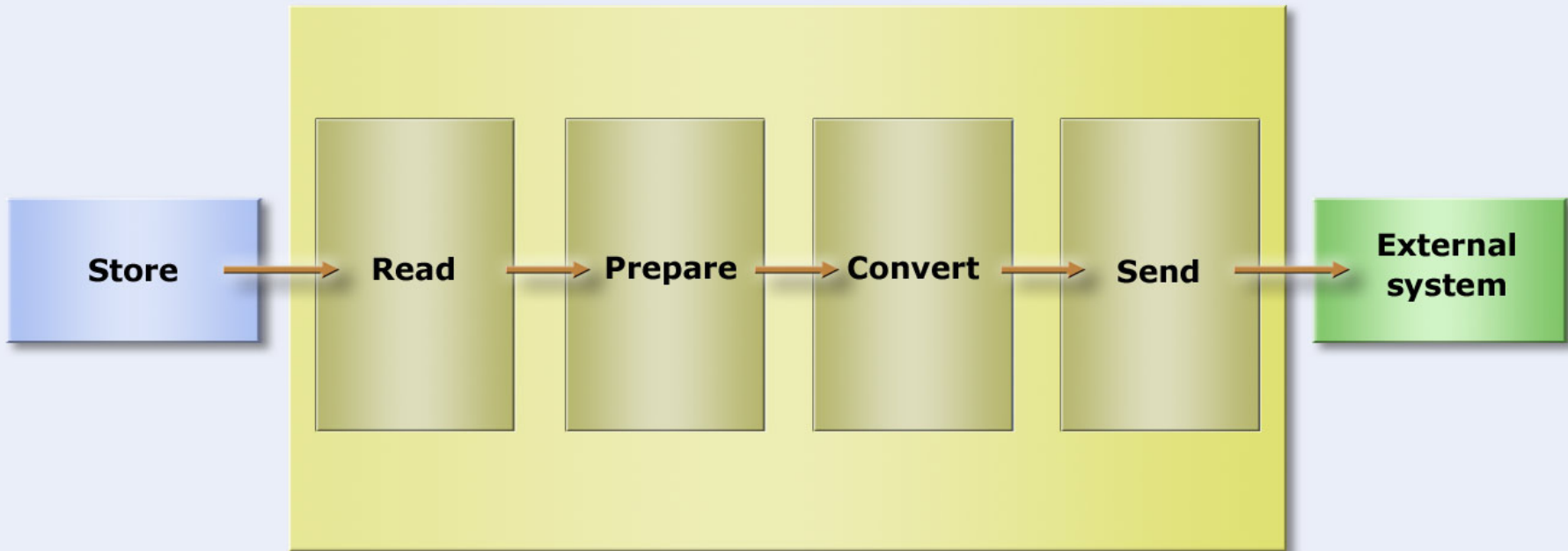
- Collect.
- Distribute.
- Automatically create.
- Monitor.

◆ **Scalability of components:**

- Scale vertically: multiple components can run on one machine.
- Scale horizontally: components can be run on multiple machines.



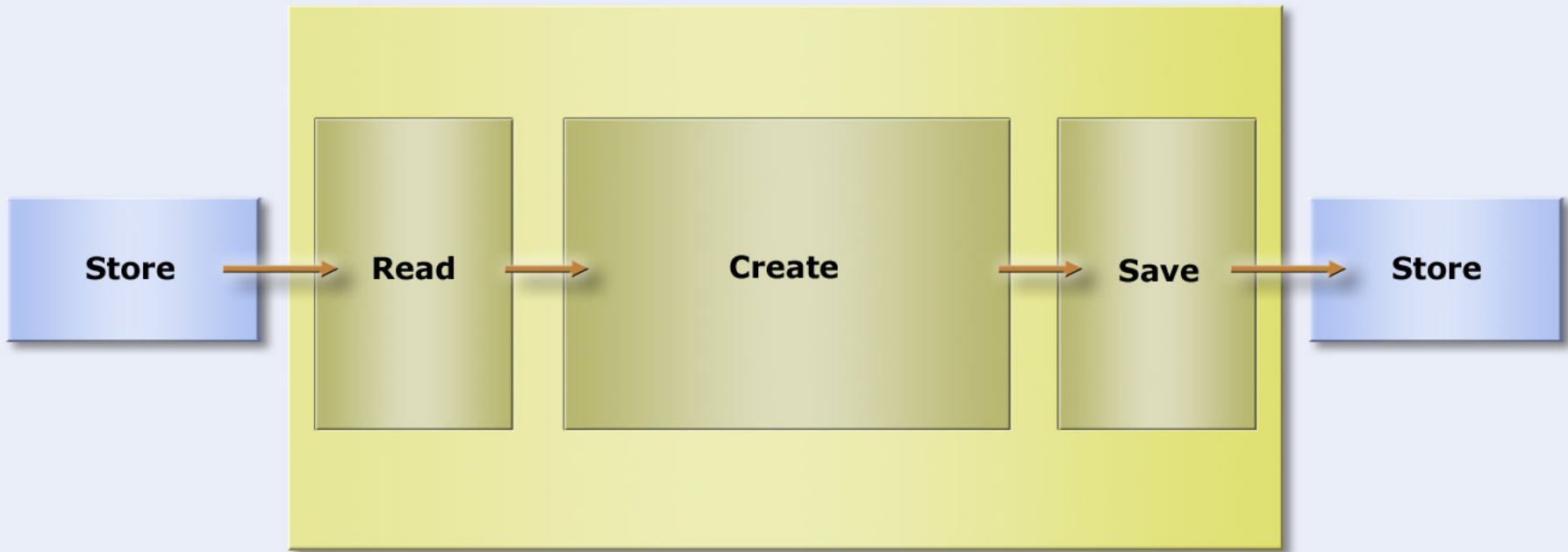




- ◆ **Traffic Flow from Road Sensor.**
- ◆ **Traffic Flow from Vehicle.**
- ◆ **Traffic Event from Traffic Flow.**
- ◆ **Traffic Flow from Traffic Flow:**
  - Spatial completion.
  - Time completion (forecast, prediction).
- ◆ **... and more.**

# Architecture

TIC Server component "Automatically create" (steps)



#### ◆ **Supports the following connection types:**

- Web Service (SOAP over HTTP).
- Windows File System.
- FTP.
- HTTP File Transfer.
- TCP/IP.
- Email (POP3 , SMTP).
- Serial.

- ◆ **Hierarchical data model.**
- ◆ **Data processed by objects.**
- ◆ **Data types are implemented as object types.**
- ◆ **Object types define the different sets of elements and hierarchical structures.**
- ◆ **XML schema can be derived automatically.**

◆ **Uses a database management system:**

- MS SQL Server 2005:
  - Standard Edition.
  - Compact Edition (included).
- Oracle (planned).

◆ **Stores all data such as:**

- Content and configuration.
- Live and historical.



- ◆ **Resources: 10.**
- ◆ **Development platform**
  - MS Visual Studio 2008
  - MS Team Foundation Server.
- ◆ **Based on C# and MS .NET 3.0.**
- ◆ **Weekly development releases.**

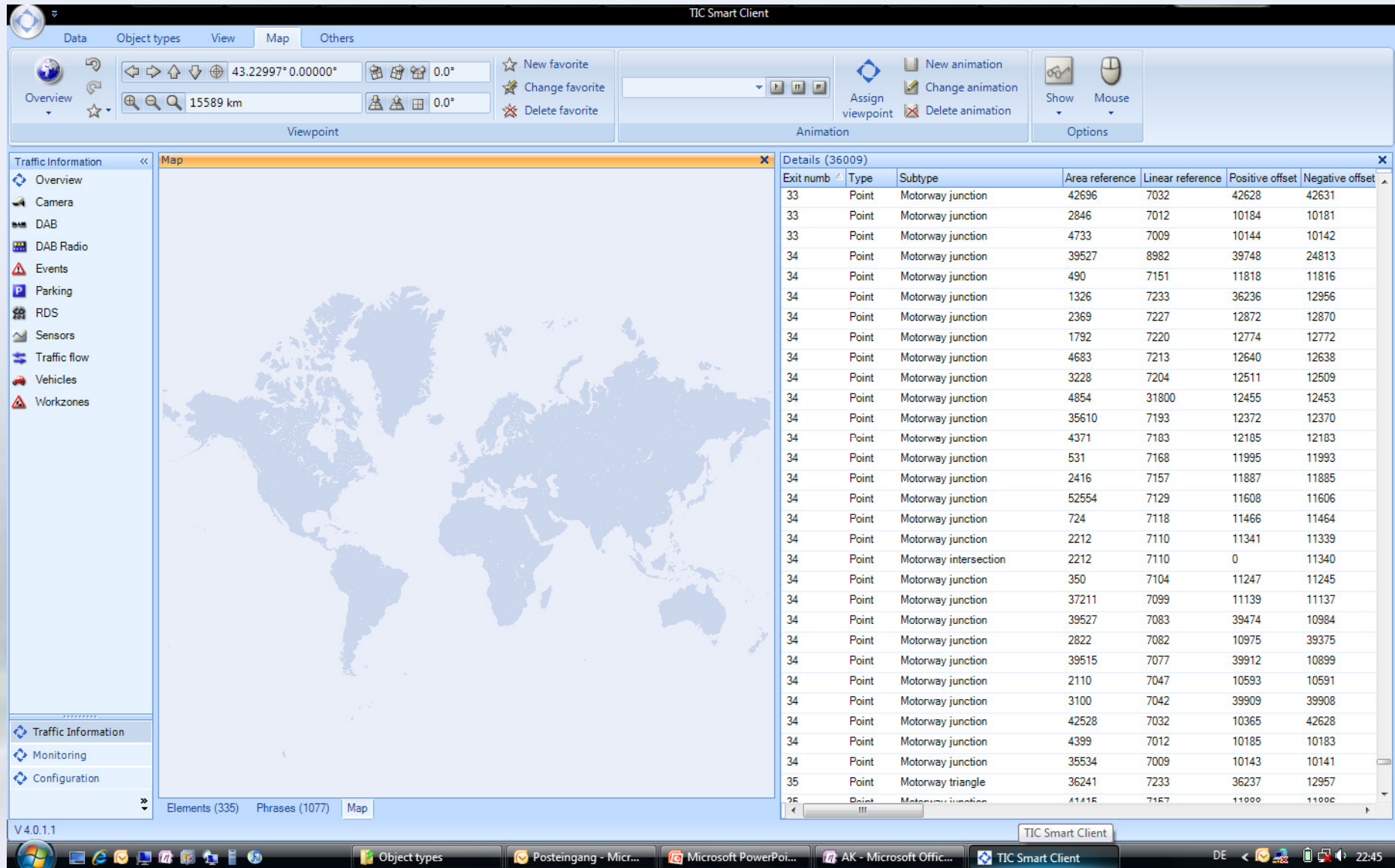
◆ **TIC Smart Client**

- For high operator productivity on a PC.
- Web based deployment.
- Incremental automatic updates.
- Connectivity based on Web service (SOAP over HTTP).

◆ **TIC Browser Client**

- For use on any PC or PDA installed with a Web browser.
- Most popular Web browsers are supported.
- Moderate performance.
- Functionality not as rich as TIC Smart Client.

◆ **Multiple clients can be connected.**



**TIC Smart Client**

Menu: Data | Object types | View | Map | Others

Viewpoint: 43.22997° 0.00000° | 15589 km | 0.0°

Animation: Assign viewpoint, New animation, Change animation, Delete animation

Options: Show, Mouse

**Traffic Information**

- Overview
- Camera
- DAB
- DAB Radio
- Events
- Parking
- RDS
- Sensors
- Traffic flow
- Vehicles
- Workzones

**Map**

Elements (335) | Phrases (1077) | Map

**Details (36009)**

Exit numb	Type	Subtype	Area reference	Linear reference	Positive offset	Negative offset
33	Point	Motorway junction	42696	7032	42628	42631
33	Point	Motorway junction	2846	7012	10184	10181
33	Point	Motorway junction	4733	7009	10144	10142
34	Point	Motorway junction	39527	8982	39748	24813
34	Point	Motorway junction	490	7151	11818	11816
34	Point	Motorway junction	1326	7233	36236	12956
34	Point	Motorway junction	2369	7227	12872	12870
34	Point	Motorway junction	1792	7220	12774	12772
34	Point	Motorway junction	4683	7213	12640	12638
34	Point	Motorway junction	3228	7204	12511	12509
34	Point	Motorway junction	4854	31800	12455	12453
34	Point	Motorway junction	35610	7193	12372	12370
34	Point	Motorway junction	4371	7183	12185	12183
34	Point	Motorway junction	531	7168	11995	11993
34	Point	Motorway junction	2416	7157	11887	11885
34	Point	Motorway junction	52554	7129	11608	11606
34	Point	Motorway junction	724	7118	11466	11464
34	Point	Motorway junction	2212	7110	11341	11339
34	Point	Motorway intersection	2212	7110	0	11340
34	Point	Motorway junction	350	7104	11247	11245
34	Point	Motorway junction	37211	7099	11139	11137
34	Point	Motorway junction	39527	7083	39474	10984
34	Point	Motorway junction	2822	7082	10975	39375
34	Point	Motorway junction	39515	7077	39912	10899
34	Point	Motorway junction	2110	7047	10593	10591
34	Point	Motorway junction	3100	7042	39909	39908
34	Point	Motorway junction	42528	7032	10365	42628
34	Point	Motorway junction	4399	7012	10185	10183
34	Point	Motorway junction	35534	7009	10143	10141
35	Point	Motorway triangle	36241	7233	36237	12957
36	Point	Motorway junction	41415	7157	11000	11000

V 4.0.1.1

TIC Smart Client

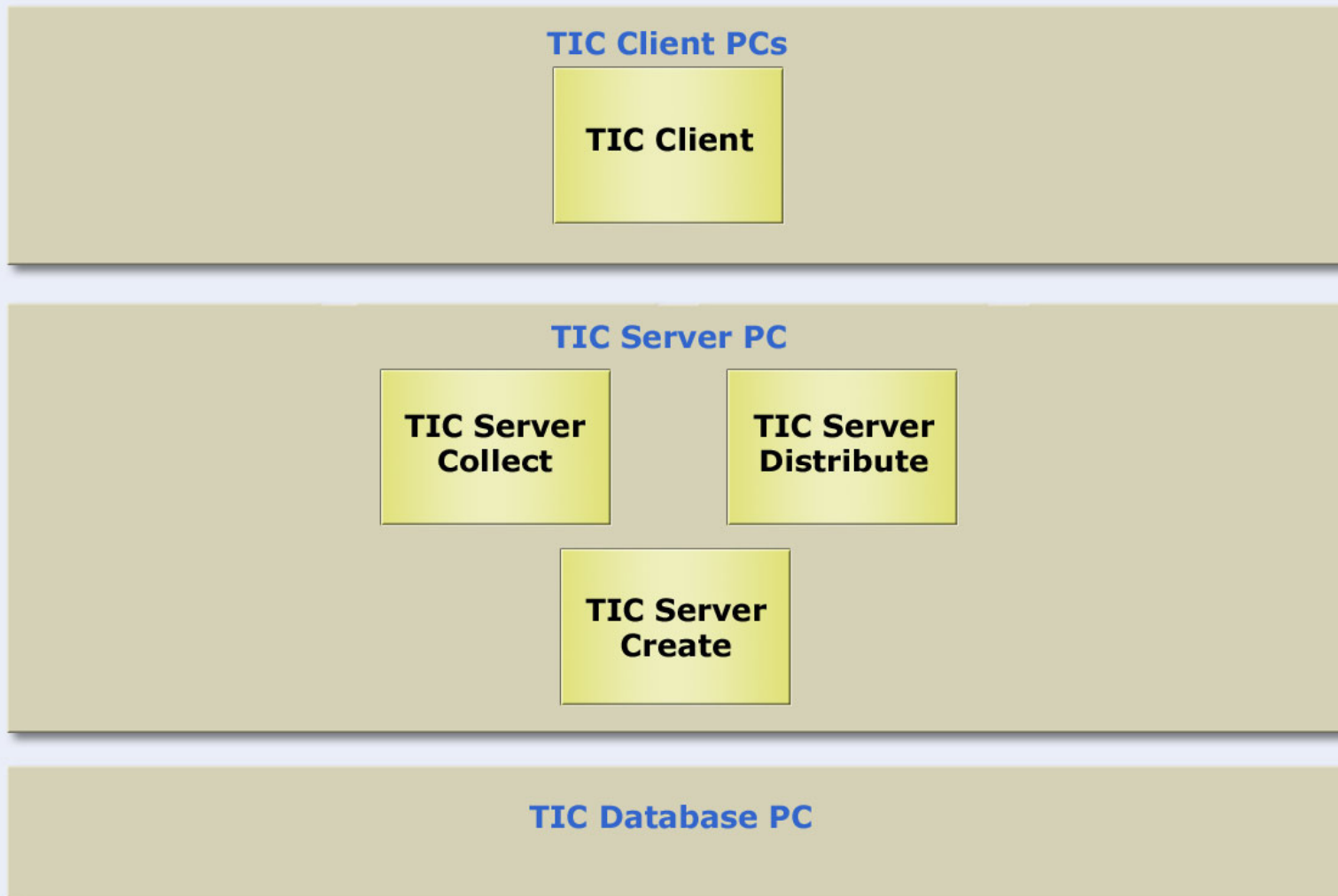
- ◆ **Processor** Dual 32-bit 3 GHz Intel or compatible Pentium IV.
- ◆ **Operating system** Windows Server 2003.
- ◆ **System memory** 2 GB free memory.
- ◆ **Hard-disk** 10 GB free space as hardware SCSI RAID 0/1.
- ◆ **Network** 100 Mbps TCP/IP.
- ◆ **Drive** DVD-ROM.
- ◆ **Graphics** XGA (1024x768), DirectX 9c, 128 MB memory.
- ◆ **Monitor** 15".
- ◆ **Time** Reliable time source (DCF 77 or SNTP).

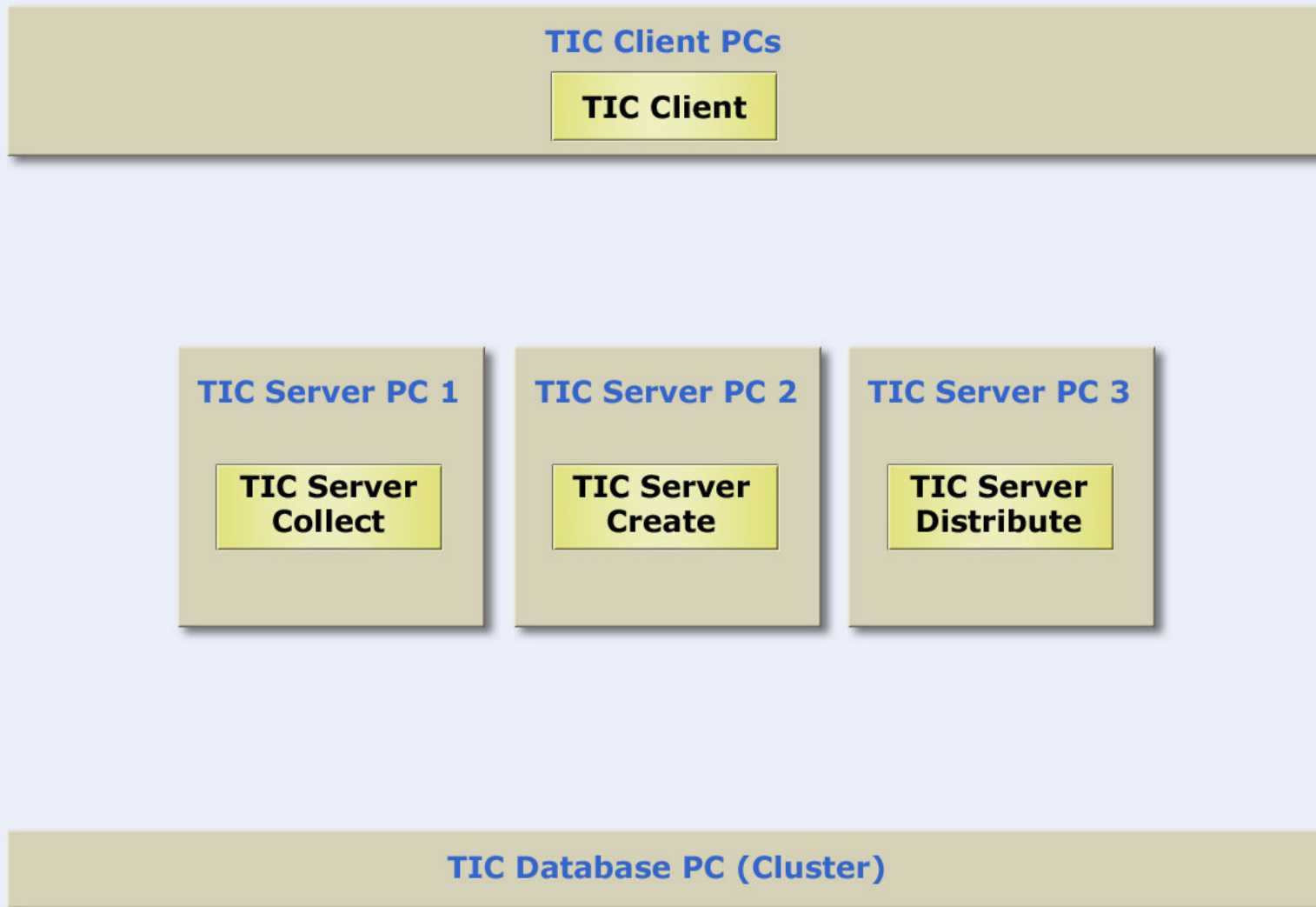
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- ◆ **Time** Reliable time source (DCF 77 or SNTP).

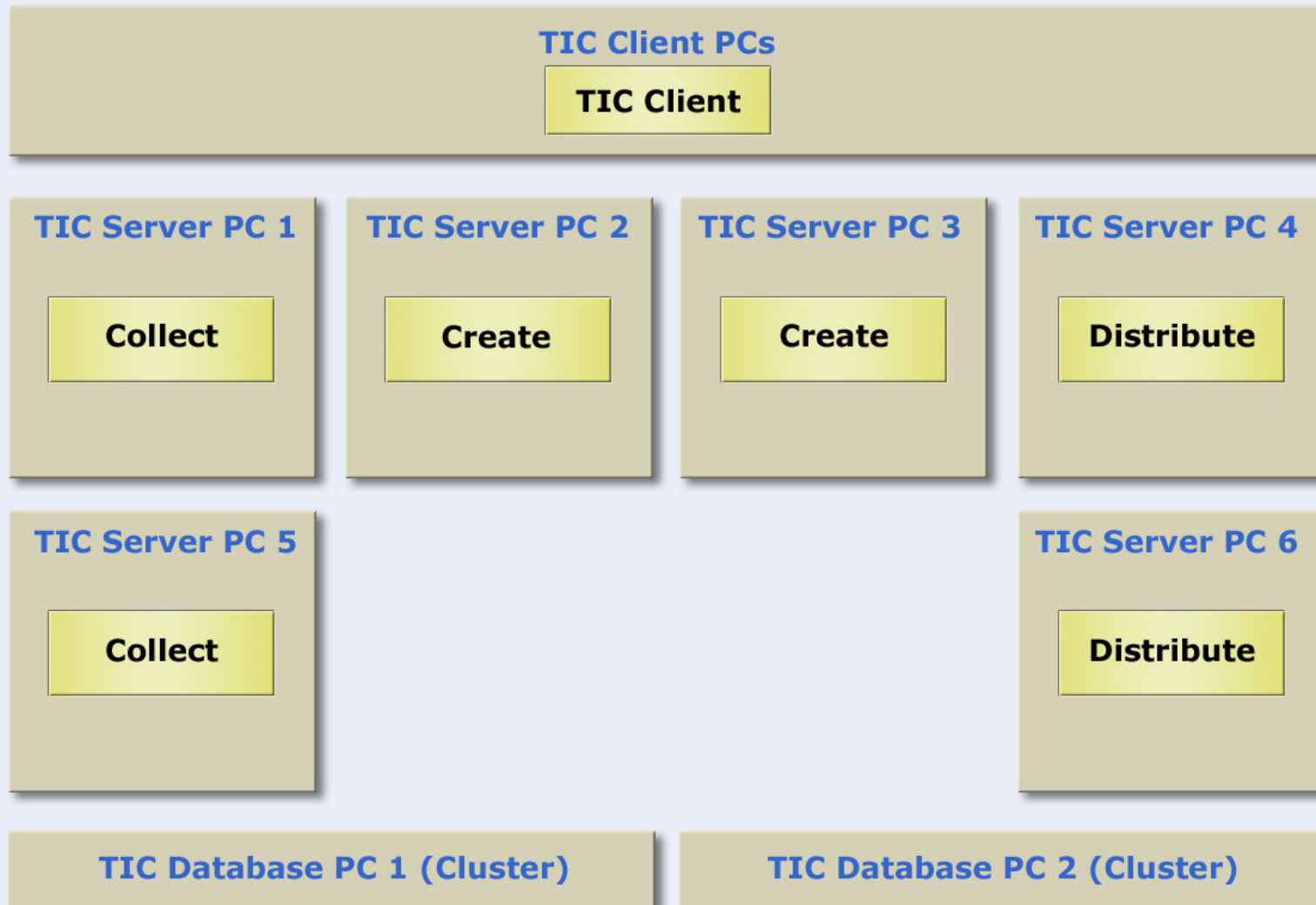
- ◆ **Processor** Single 32-bit 3 GHz Intel or compatible Pentium IV.
- ◆ **Operating system** Windows Vista.
- ◆ **System memory** 1 GB free memory.
- ◆ **Hard-disk** 10 GB free space.
- ◆ **Network** 100 Mbps TCP/IP.
- ◆ **Drive** DVD-ROM.
- ◆ **Graphics** XGA (1024x768), DirectX 9c, 128 MB memory.
- ◆ **Monitor** 17".
- ◆ **Time** Reliable time source (DCF 77 or SNTP).



- ◆ **Processor**                      Single 32-bit 3 GHz Intel or compatible Pentium IV.
- ◆ **Browser**                        MS Internet Explorer 6.0.
- ◆ **System memory**                512 MB free memory.
- ◆ **Network**                         100 Mbps TCP/IP.
- ◆ **Graphics**                        XGA (1024x768).
- ◆ **Monitor**                         17".
- ◆ **Time**                              Reliable time source (DCF 77 or SNTP).







◆ **Custom TIC Server components can be developed**

- Collect.
- Distribute.
- Automatically create.

◆ **Custom browser clients can be developed.**

◆ **Development can be provided by**

- Supplier.
- Customers and partners can customize if trained and agreed for support.



◆ **Project**

- Agree customer requirements.
- Implement and operate the system.

◆ **System**

- Result of the implementation of the delivered products and services as joint effort by the customer and the supplier.

◆ **Implement**

- Plan, develop, deliver, deploy (install, configure, train, test), accept.

◆ **Operate**

- Use, support, maintain.

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