

# Making Short Term Travel Time Forecasts available to the Public: TripCast

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# Outline of Presentation

- Importance of Traveltime Forecasts
- What the Dutch Government does to promote development and use
- Traveltime Forecasting Contest 2008 & 2011
- About TripCast
- Bringing TripCast to the Public: TripCast website and Traffical iPhone diary management

# Importance of Traveltime Forecasts

- Individual benefits
  - Better information
    - ➔ Better choices, Less uncertainty
- External benefits
  - Individuals avoid congested time-slots and routes
    - ➔ reduced total travel time for remaining travelers

# Role of Dutch Government

- Ministry of transport takes care of data collection and provides traffic data at limited cost
- Providing traffic information services to the public is left to private companies
- Government initiates and promotes new modeling initiatives on project basis

# Travel Time Forecasting Contest

- Organized on behalf of Ministry of Transport
- Held for the first time in 2008, second contest took place in 2011
- Contenders participate by making available a web service
- Travel Times are checked by a various techniques *including probes*
- Prizes consist of subsidy for launching website or Smartphone App

# Contest 2008

- Prizes for best point estimate online, best point estimate offline, best reliability interval
- 600 trips submitted 300 trips checked
- **3 hr < Prediction horizon < 1 week**
- Person cars only
- mainly motorway trips
- 7 contenders

# Modelit won first prize with TripCast Algorithm....



# Summary of the TripCast Model

- Path computation based on average traveltime
- Retrieve loop data from historic database
- Create contourplot
- Off-line simulation: build trajectories for about 4000 departure times
  - ➔ travel time distribution based on 4000 trips
- Compute point estimate & reliability intervals

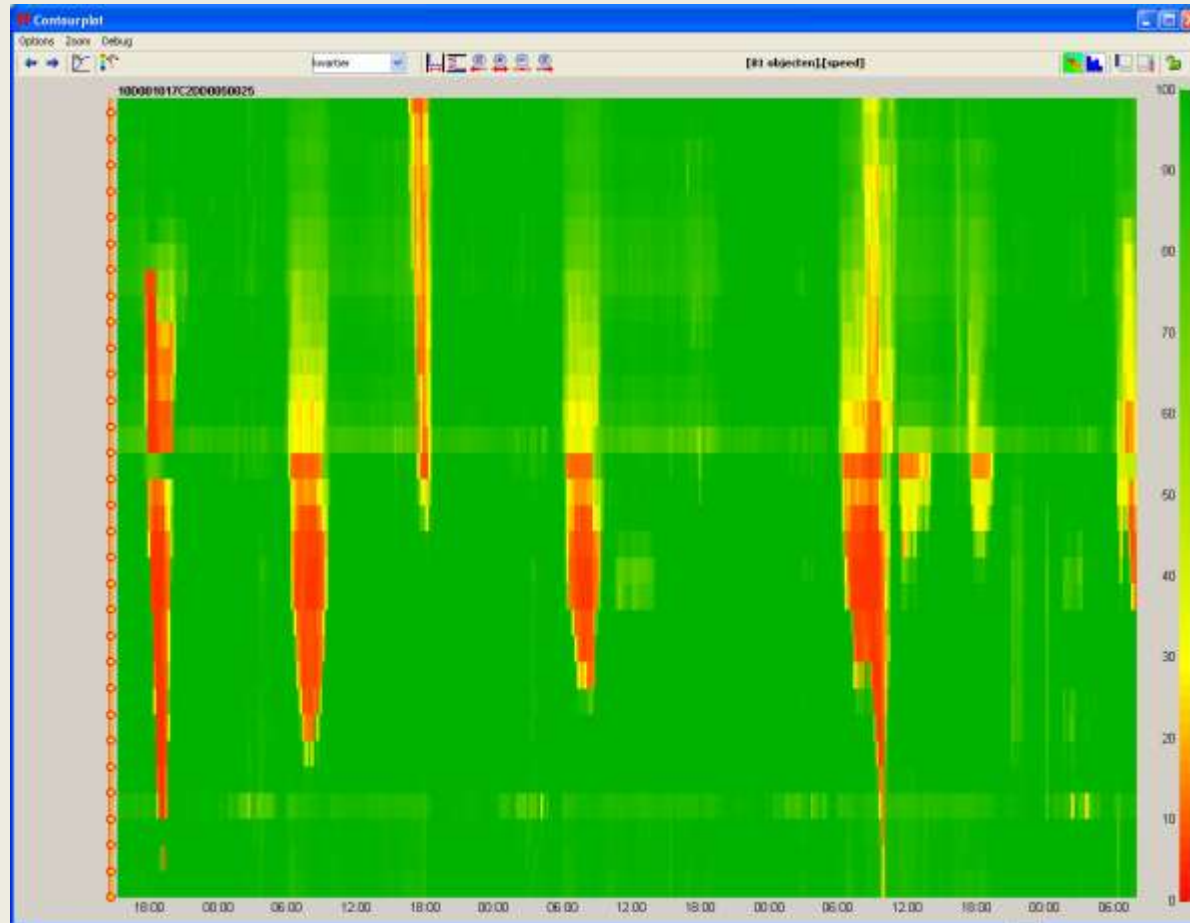


# Path & Loops

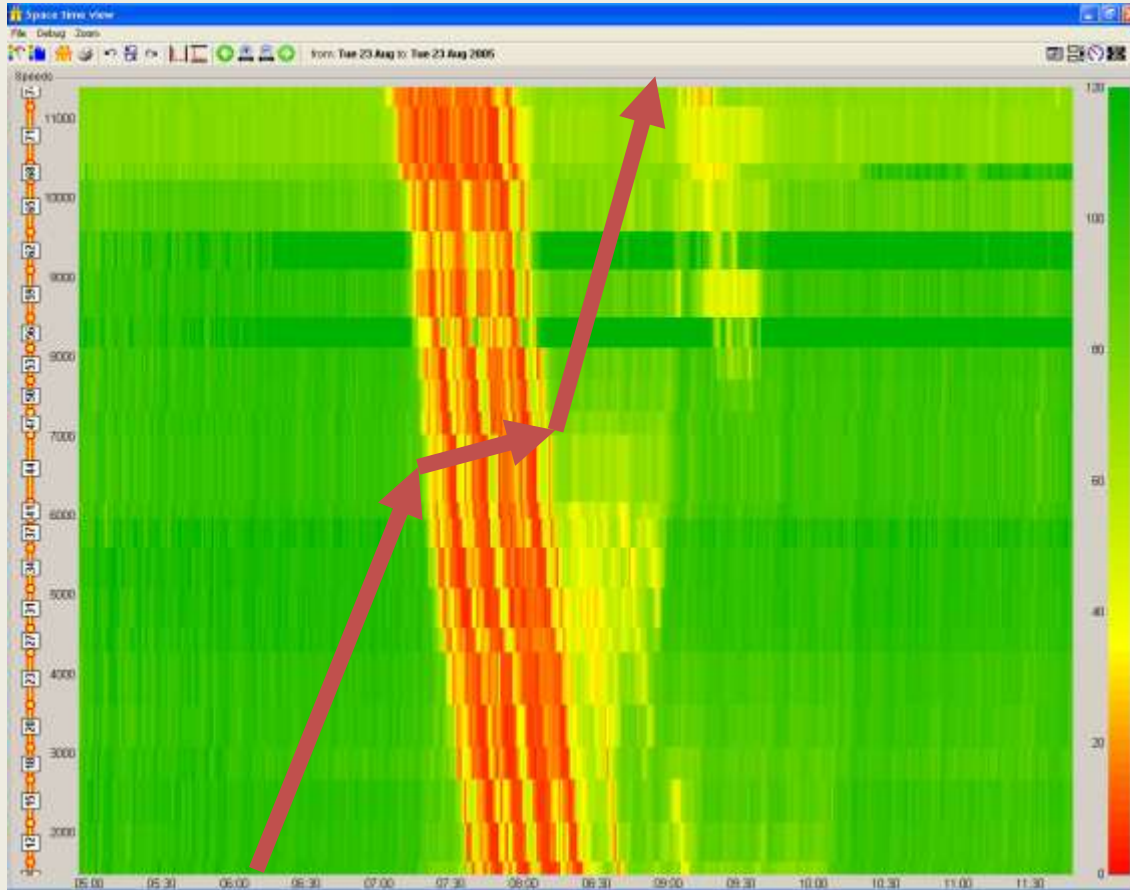
The screenshot displays the TRIP software interface. The main window shows a map with a network of roads and a highlighted path. The left sidebar contains several panels: 'Layers' with checkboxes for 'Road sections', 'Nodes', 'Hectopoints', 'Speed limits', and 'Number of lanes'; 'Modelled network' with a checkbox for 'Road sections'; 'Study period' with 'start date' (01-01-2006) and 'end date' (28-12-2006); and 'Parameter' with 'Available datasources' (aldia, ht) and a tree view of data fields like 'flow', 'speed', 'status', 'Flowing', 'WHEAN', 'WPIS', 'VAL100', 'VAL50', and 'VAL0'. The bottom right panel, 'Selected detectors', shows a table with columns: Type, Hn, DAY, Link, BASH, BRK, MCSS, Lane, LnPos, Match, FAWB ID, Relpos, and BPS. The table contains 20 rows of data for various detectors.

Type	Hn	DAY	Link	BASH	BRK	MCSS	Lane	LnPos	Match	FAWB ID	Relpos	BPS
[TSW]	1.1	40010	9	HR	LN	R	L		3	317329010	2145	10000107300400050025
[TSW]	1.1	40050	9	HR	LN	R	L		3	317329010	2158	10000107300000050025
[TSW]	1.1	40190	9	HR	LN	R	L		3	314331017	756	10000107035400050025
[TSW]	1.1	44440	9	HR	LN	R	L		3	314331017	1304	10001186700000050025
[TSW]	1.1	43070	9	HR	LN	R	L		3	312394021	230	10001186440000050025
[TSW]	1.1	43060	9	HR	LN	R	L		3	312394021	900	10001186800000050025
[TSW]	1.1	42000	9	HR	LN	R	L		3	312394021	1300	10001186400000050025
[TSW]	1.1	41390	9	HR	LN	R	L		3	311294052	472	10001186250000050025
[TSW]	1.1	41050	9	HR	LN	R	L		3	311294052	811	10001186732000050025
[TSW]	1.1	41100	9	HR	LN	R	L		3	309336997	190	10001186400000050025
[TSW]	1.1	40950	9	HR	LN	R	L		3	309336997	740	10001186432000050025
[TSW]	1.1	43070	9	HR	LN	R	L		3	306937014	276	10001186400000050025
[TSW]	1.1	39905	9	HR	LN	R	L		3	307337007	154	10001186200000050025
[TSW]	1.1	39245	9	HR	LN	R	L		3	307337007	414	10001186200000050025
[TSW]	1.1	38850	9	HR	LN	R	L		3	305338008	390	10001186200000050025
[TSW]	1.1	39050	9	HR	LN	R	L		3	302339006	480	10001186700000050025
[TSW]	1.1	37650	9	HR	LN	R	L		3	302339006	900	10001186700000050025

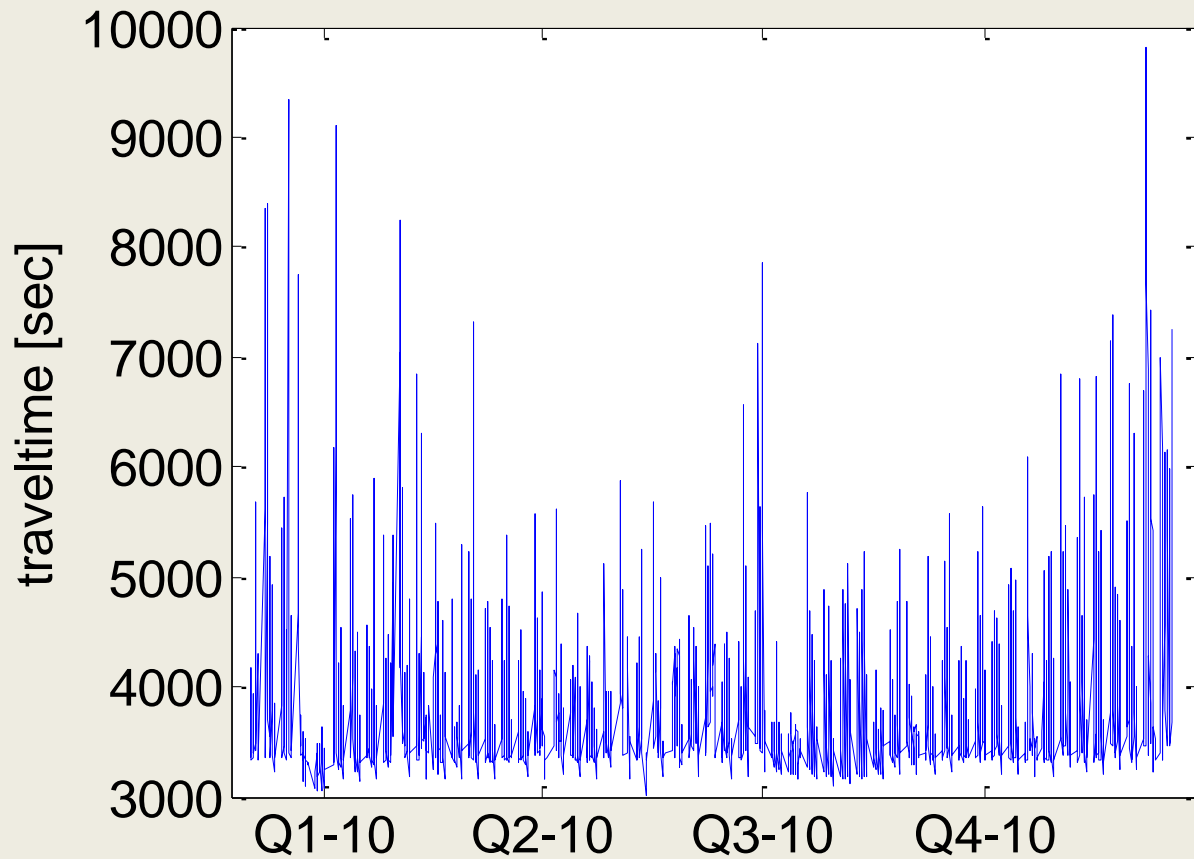
# Space-time plot of speeds



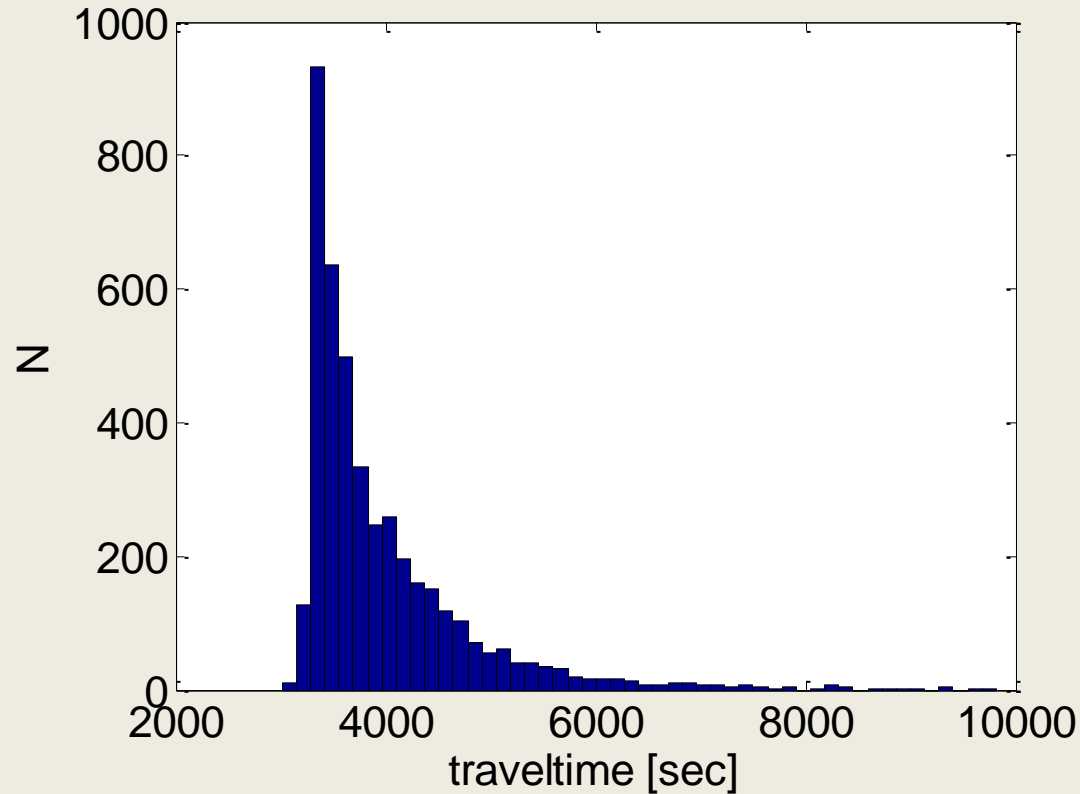
# Build trajectories



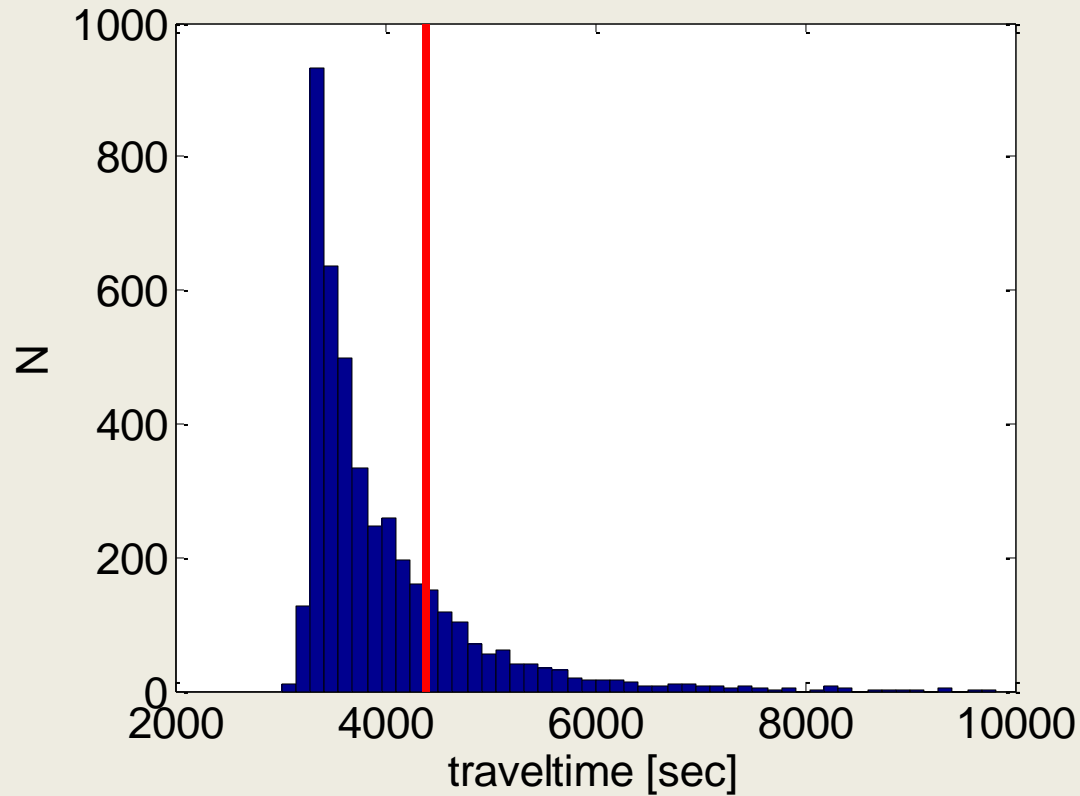
# Time series of simulated traveltimes



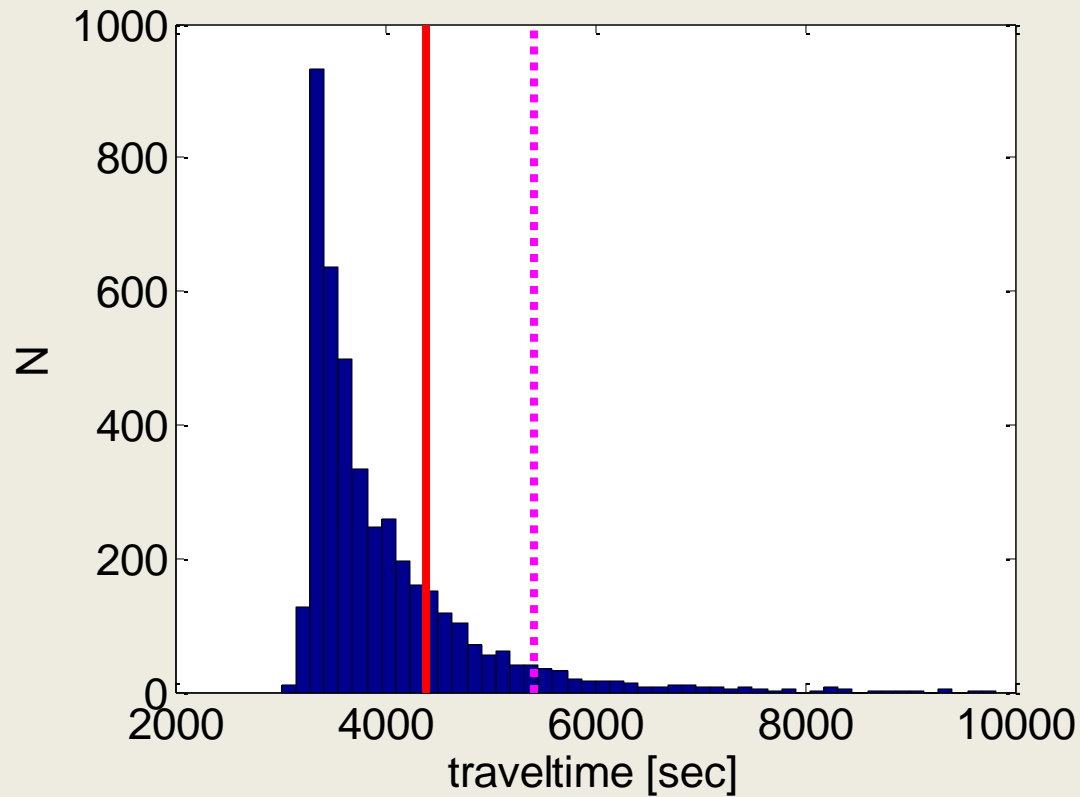
# Histogram of travel times



# Expected value: 4387 sec



# 90 % certainty: 5427 sec



# Attributes taken into account

- Weather conditions
  - Rain
  - Snow
  - Light
- Vacations
- Bank holidays
- Season
- Age of data



# Utilizing the 2008 TripCast Model

- Prize is conditional on usage of the model → find users for the model
- 500.000 users required
- Implement TripCast as a webservice
- Implement TripCast website
- Website marketing through Google AdWords
- TripCast also available through other channels

# TripCast website

The screenshot shows the TripCast website interface. At the top, there is a navigation bar with links for 'Routeplanner', 'Nieuws', 'Help', 'Meld probleem', 'Samband', 'Meldt', and 'Classificatie'. The main content area is divided into several sections:

- Van/Naar:** 4101kn, schiphol
- Tijdstip:** Morgen om 16 jun, 00:40, Aankomst
- Zekerheidscoëfficiënt:** 90% zekerheid
- Route en reistijd berekenen** button
- nacht nu - da 18 - 04 uur:** A weather forecast section with a 75% chance of rain and a 15% chance of snow.
- Reistijd in minuten:** A line graph showing travel time in minutes over several days.
- Kaart:** A map showing a route from Amsterdam to Schiphol, with various road types and landmarks.
- Tripcast reistijdverwachting:**
  - Verbrek: 05:43
  - Reistijd: 57 min
  - Zekerheid: minder dan 5% kans op overschrijding van de weergegeven reistijd
  - Afstand: 75,1 km
  - Aankomst: 06:40
- Actuele reistijd:** De actuele reistijd op dit traject is 48 min (22:24)
- Actuele files op deze route:** Geen files op deze route
- Actuele files:**
  - Er zijn op dit moment 2 meldingen met een totale lengte van 4 km.
  - A12 Amheim - Utrecht 3.9 km:** Tussen knooppunt Driebergen en knooppunt Lunetten 100% van de file wordt korter.
  - A58 Vlissingen - Bergen op Zoom 0.8 km:** Tussen afd. 's-Gravenpolder en afd. Yerseke Afgeëten
- 4101kn** and **Verbrek: 05:43** are also displayed.
- Route instructions:**
  1. Verbrek in zuidoostelijke richting op de Elisabethdreef naar Oostersingel 96 m
  2. Neem de 1e afslag rechts, de Oostersingel op 850 m
  3. Oostersingel draait iets naar rechts en wordt Weidsburg 160 m
  4. Neem op de rotonde de 2e afslag naar Stationsingel 400 m

# Three years later: Contest 2011

- Prizes for best point estimate online and best reliability interval
- 8000 trips submitted
- 1900 trips checked
- **0 hr < Prediction horizon < 4 hr**
- Person cars and trucks
- **motorway and urban trips**
- 6 contenders

# Modelit wins again in 2011 ...

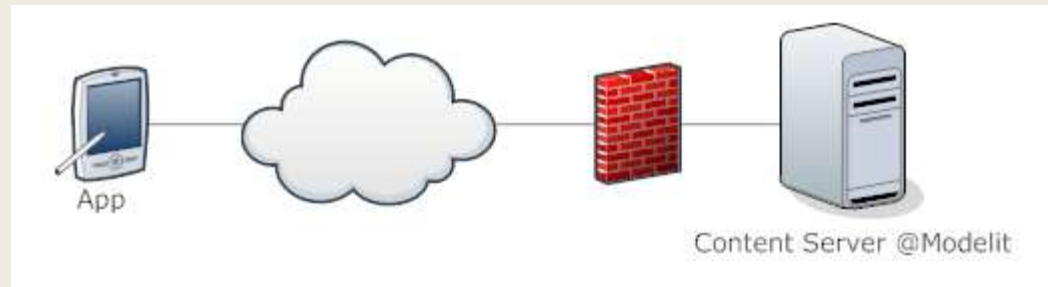


# Utilizing the 2011 TripCast Model

- Prize is conditional on usage of the model
- 750.000 users required before the end of 2011
- Plans to achieve 750K users:
  - Improve website
  - Improve hardware
  - Create new online services
  - Create services for smartphone
- TripCast webserice & TripCast Alert service

# Example of Application Powered by TripCast: Traffical

- Traffical runs on BlackBerry and Iphone
- Traffical is **linked with diary**
- Traffical plans travel time in diary automatically
- Traffical **notifies** users of any delays





# Traffical voor iPhone en iPad



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# Traffical voor iPhone en iPad

T-Mobile NL 3G 11:57

Nieuwe afspraken **Plan trip**

Reis gegevens

**Van:**  Haarlem

**Naar:** Utrecht

**Aankomst:** 15:59

**Parkeertijd (min):**  15

**Plan terugreis:**  OFF

**Extra zekerheid:**  OFF

Afspraak gegevens

**Onderwerp:** Voorbereiding bij...

**Berekenen** **Bewaren** **Afbreken**

T-Mobile NL 3G 11:57

Nieuwe afspraken **Plan trip**

**Parkeertijd (min):**  15

**Plan terugreis:**  OFF

**Extra zekerheid:**  OFF

Afspraak gegevens

**Onderwerp:** Voorbereiding bij...

**Locatie:** Utrecht

**Start:** 26-04-2011 16:00

**Einde:** 26-04-2011 17:00

**Berekenen** **Bewaren** **Afbreken**

# Traffical voor iPhone en iPad

T-Mobile NL 3G 11:57

Nieuwe afspraken **Plan trip**

Reis gegevens

**Van:**  Haarlem

**Naar:** Utrecht

**Aankomst:** 15:59

**Parkeertijd (min):**  15

**Plan terugreis:**  OFF

**Extra zekerheid:**  OFF

**Route:** via N205 - A205 - A9 - A2

**Afstand:** 54.68 km

Berekenen Bewaren Afbreken

T-Mobile NL 3G 11:57

Nieuwe afspraken **Plan trip**

**Afstand:** 54.68 km

**Reistijd:** 58 min

**Vertrek:** 14:47

**CO2:**  Eigen voertuig: 5.40  
Klein voertuig: 6.94 KG  
Mid voertuig: 10.44 KG  
Groot voertuig: 14.05 KG  
Trein: 2.90 KG

Afspraak gegevens

**Onderwerp:** Voorbereiding bij...

Berekenen Bewaren Afbreken

# Traffical voor iPhone en iPad





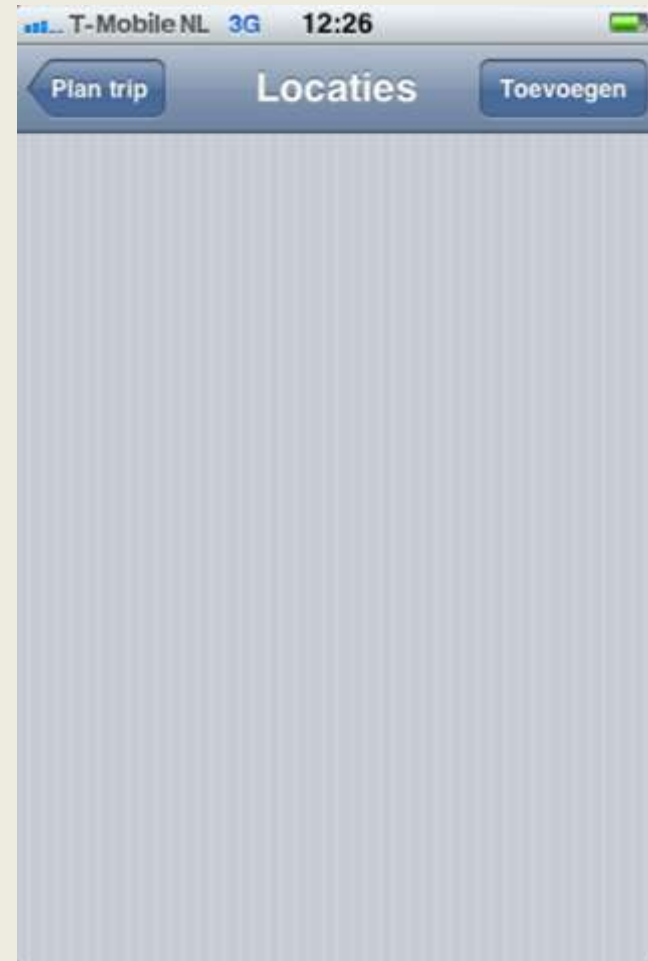
# Traffical voor iPhone en iPad



# Traffical voor iPhone en iPad



# Traffical voor iPhone en iPad





# Traffical voor iPhone en iPad



# Looking back at the last 3 years

Effort has been 20% traffic modeling and 80% problem solving, but:

- Maps and realtime data become more and more available
- Powerful computing equipment and network services become more and more affordable
- Software development tools increase span of control of individual engineers

➔ Many opportunities exist for small development teams

# Looking forward

- Maintain and improve TripCast Model
- Develop new services
- Expand user base in the Netherlands
- Find international partners to apply TripCast outside the Netherlands
- Enable international expansion of Traffical

# Further questions

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