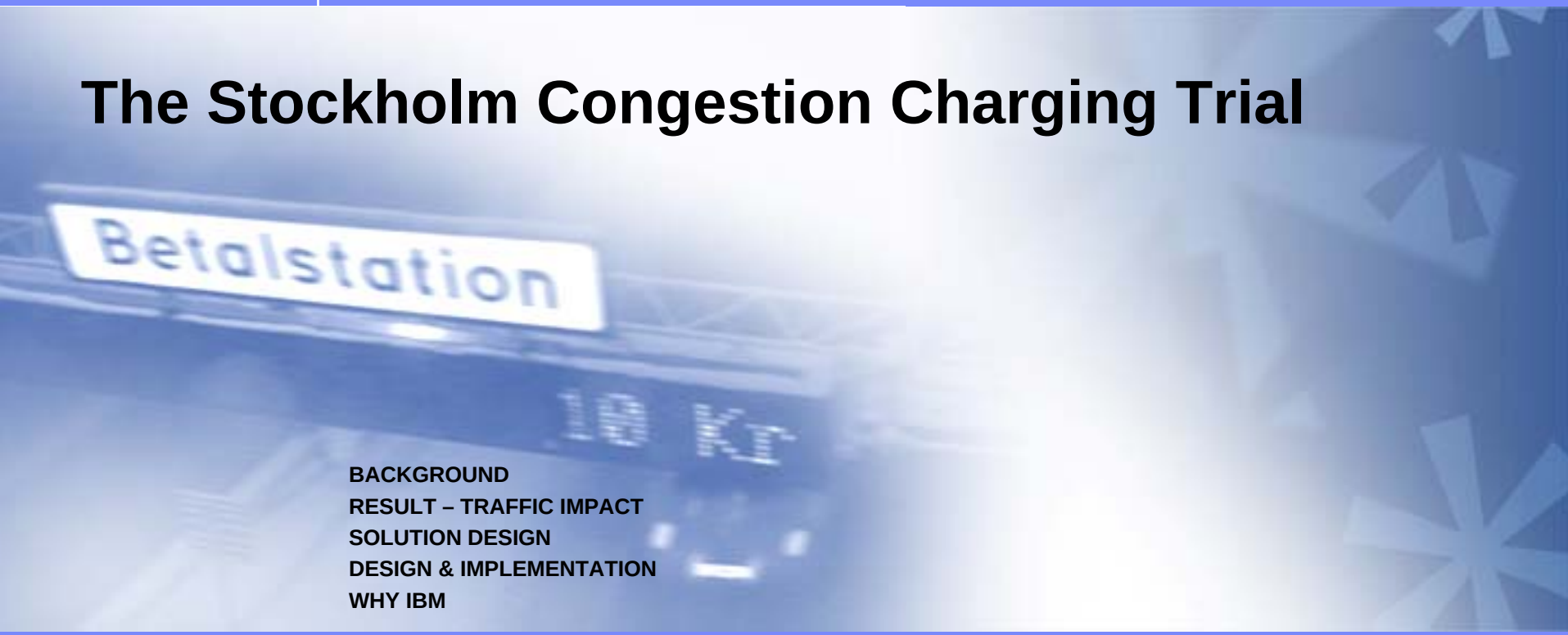
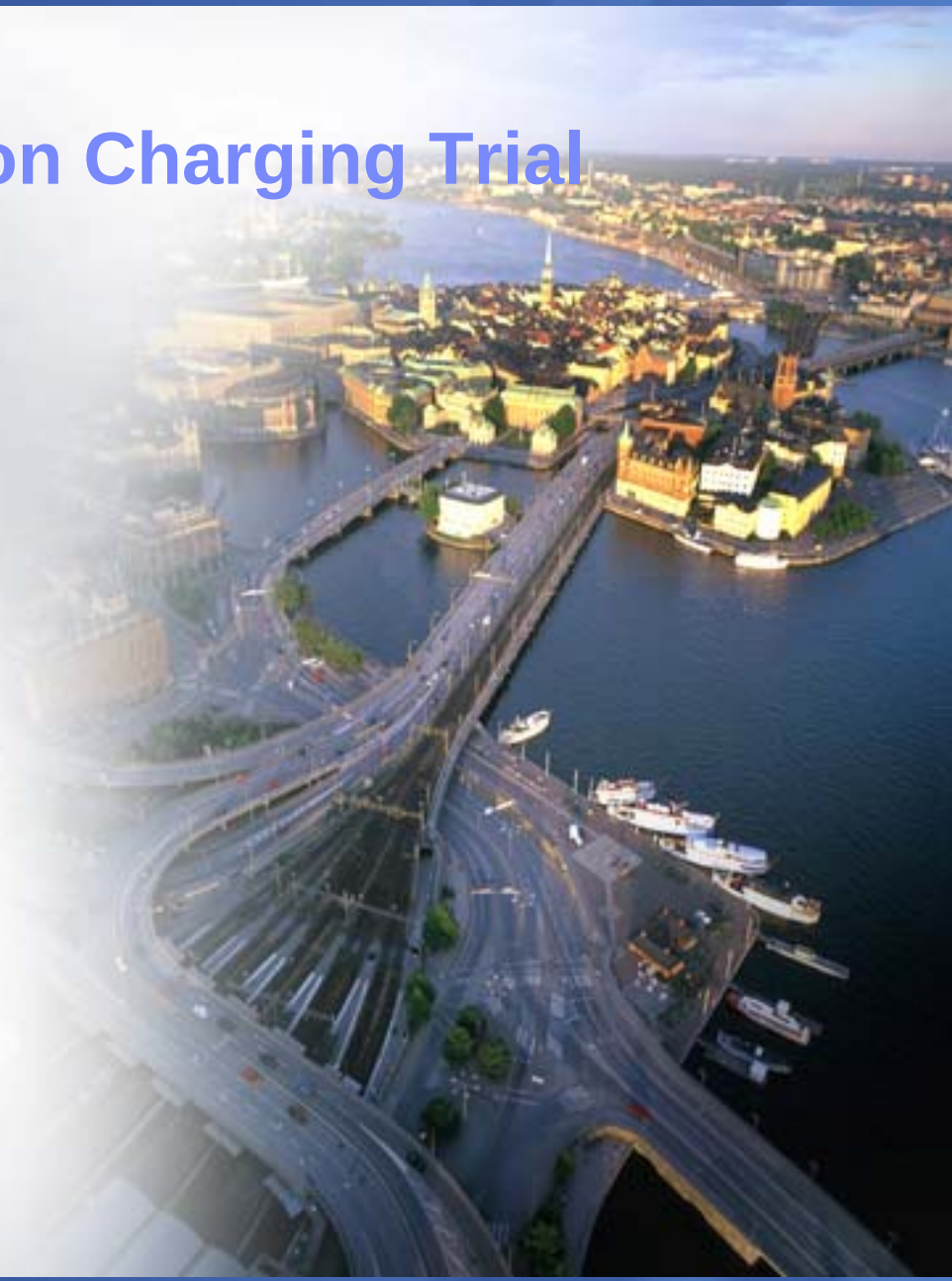
Presentation

The Stockholm Congestion Charging Trial



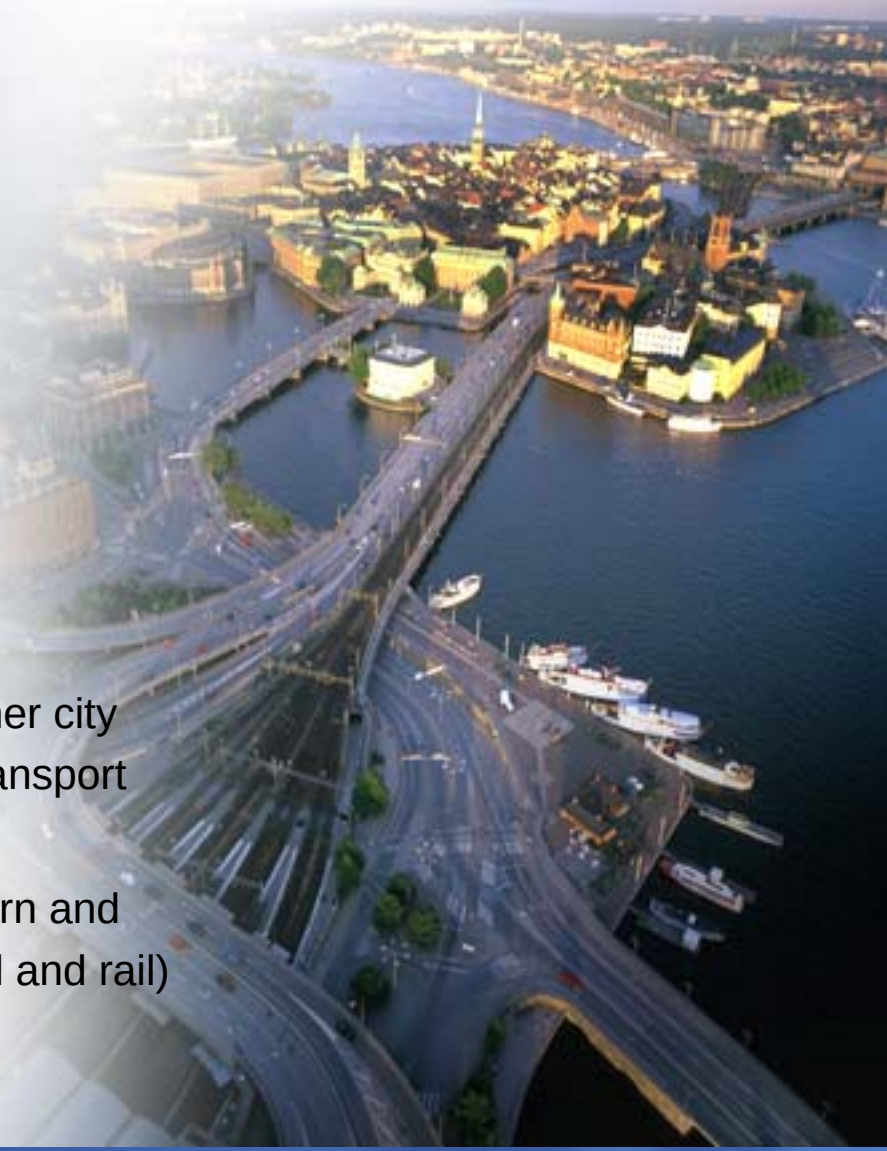
BACKGROUND
RESULT – TRAFFIC IMPACT
SOLUTION DESIGN
DESIGN & IMPLEMENTATION
WHY IBM

The Stockholm Congestion Charging Trial



BACKGROUND ››

Situation in Stockholm



Inhabitants

- 1,9 million in the county of Stockholm
- 760 000 in the city of Stockholm
- 275 000 in the Stockholm inner city

Travel & transportation

- 560 000 vehicles cross the inner city cordon per working day
- 73% of all personal trips across the inner city cordon during rush hour is by public transport
- 2,5% car ownership increase per year
- Lack of capacity in between the northern and the southern halves of the region (road and rail)

BACKGROUND

Situation in Stockholm

External impacts

- Congestion estimates cost 600 to 800 million Euro per year
- 361 severely injured & 18 traffic deaths
- 10 – 100 cases of cancer caused by atmospheric pollution
- 50 000 inhabitants exposed to over 65 dBA

BACKGROUND

Situation in Stockholm

Objectives

- Reduce congestion – reduce traffic volume by 10 – 15 % during rush hour
- To improve accessibility for buses and cars in the inner city
- Improve the environment

The Stockholm Trial – 4 Parts

Road Administration
Congestion Charges
System Owner
Information how to pay tax

IBM
Design, Build & Operate
the solution and
all processes

SL
Public Transport Operator

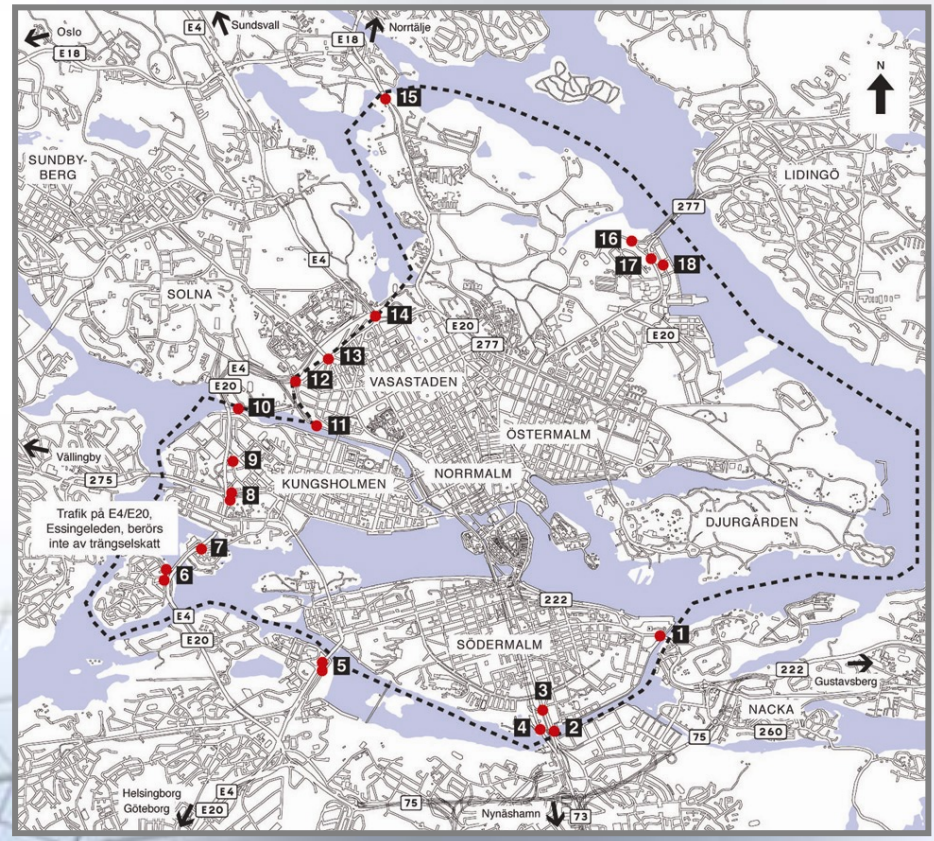
The city of Stockholm
Procurement
General Information
Evaluation Program
Park-and-Ride

Congestion Charges Trial Period

- Trial period January 2006 – July 2006
- Referendum September 2006
- Decision about making the system permanent or not

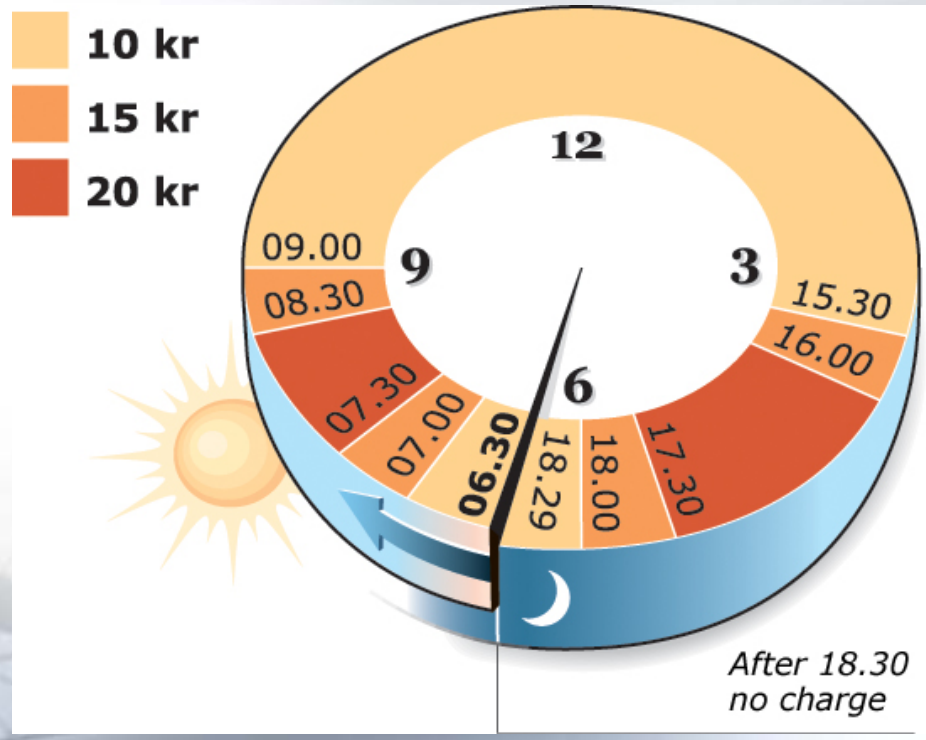
Charging Schemes Design

- Charges in both directions
- Exempted traffic
  - To and from the Lidingö islands
  - Emergency vehicles
  - Vehicles with disability permits
  - Foreign cars
  - Buses over 14 tons
  - Taxis
  - Motorcycles
  - Environmental vehicles



Pricing approach for redistributing traffic

- Variable charges
- No charges during low traffic periods
- Max charge 60 SEK per day (6 Euro)



The Stockholm Congestion Charging Trial

Like establishing a new Company ››

Solution Complexity

Volumes

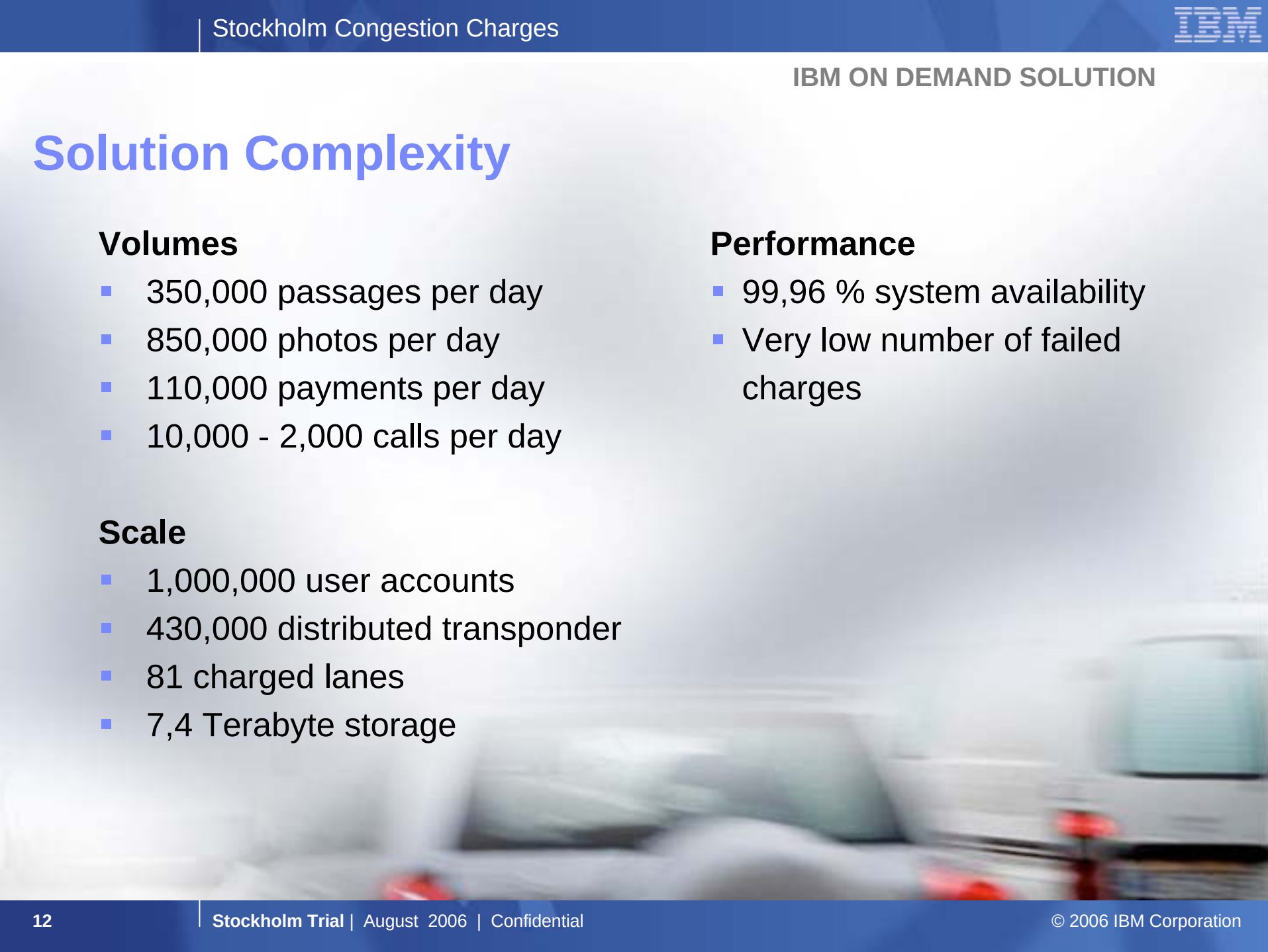
- 350,000 passages per day
- 850,000 photos per day
- 110,000 payments per day
- 10,000 - 2,000 calls per day

Scale

- 1,000,000 user accounts
- 430,000 distributed transponder
- 81 charged lanes
- 7,4 Terabyte storage

Performance

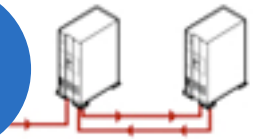
- 99,96 % system availability
- Very low number of failed charges



How does it work?

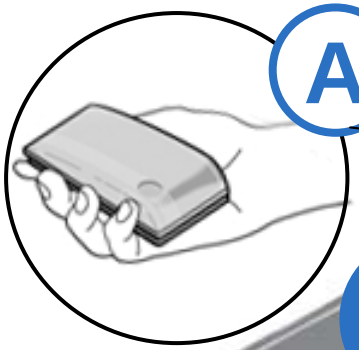
Call-centre operations managed by IBM

2



Information is matched with registered vehicle. Fee is added to the owner's account

The gateway registers the vehicle



ABC 123

1

B

Picture is taken of the vehicle's licence plate.

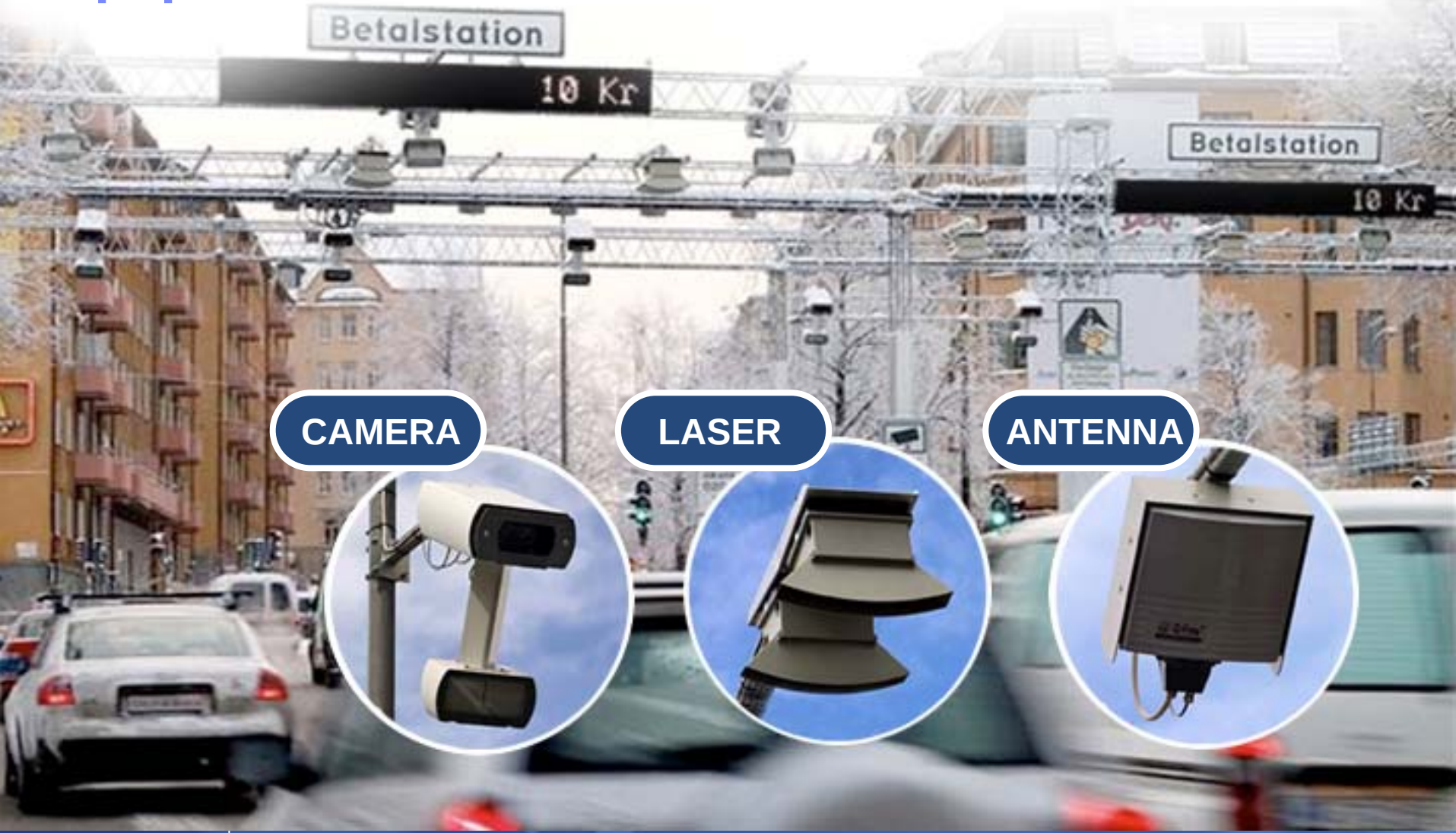
3

Way of payment

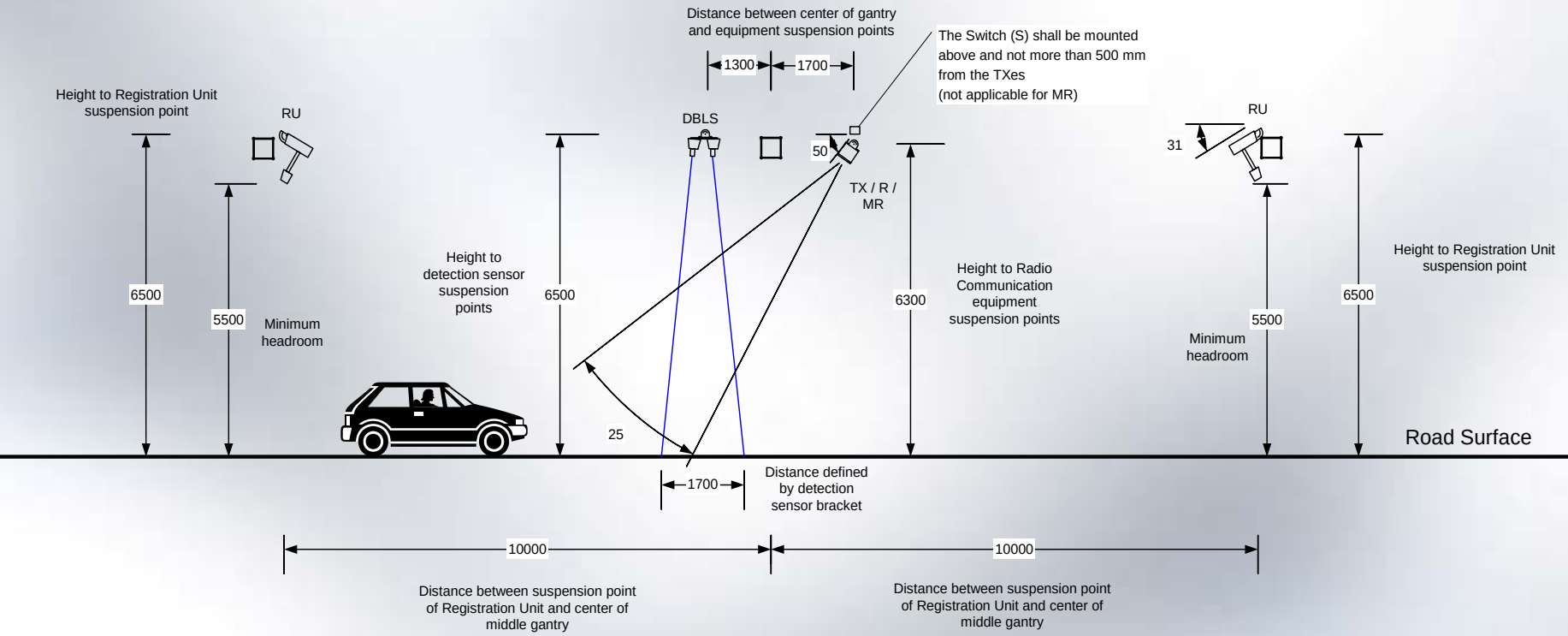
- Transponder/direct debit
- Bank/Giro
- 7-eleven/ Pressbyrån

IBM has designed, built, implemented integrated and runs the congestion charging system

Equipment



Vehicle identification process

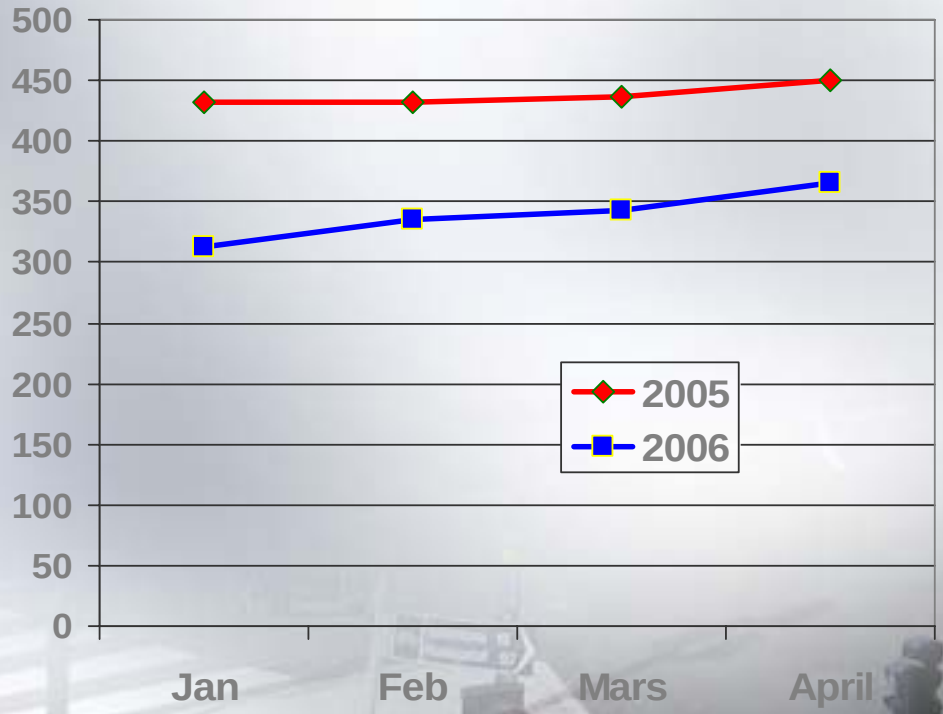


The Stockholm Congestion Charging Trial

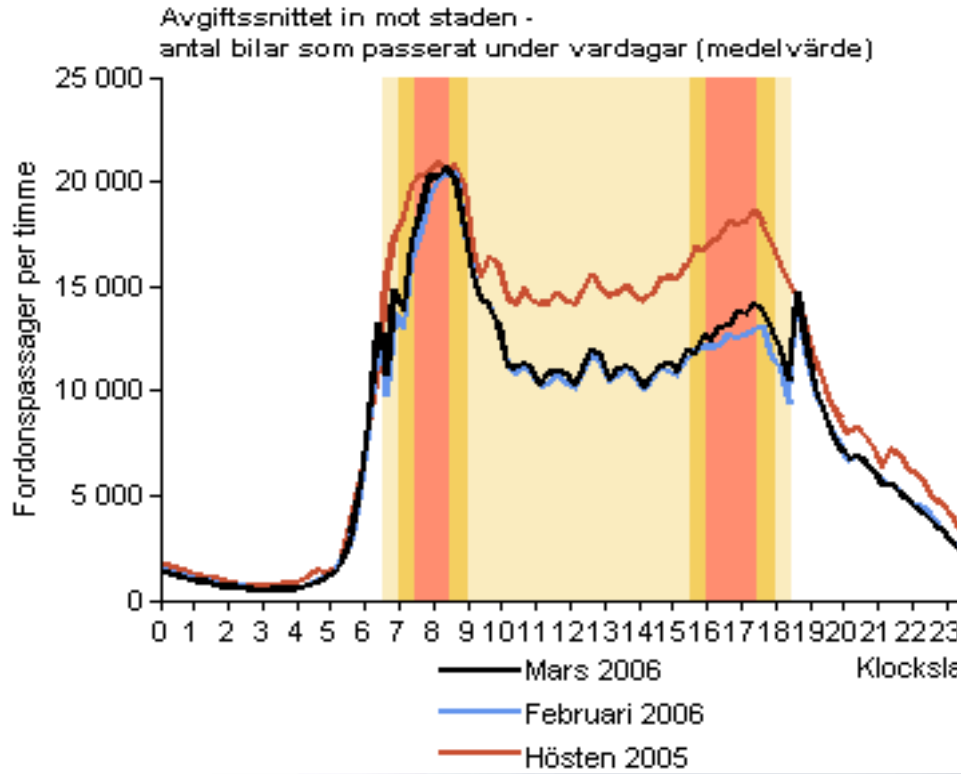
RESULT – TRAFFIC IMPACT ››

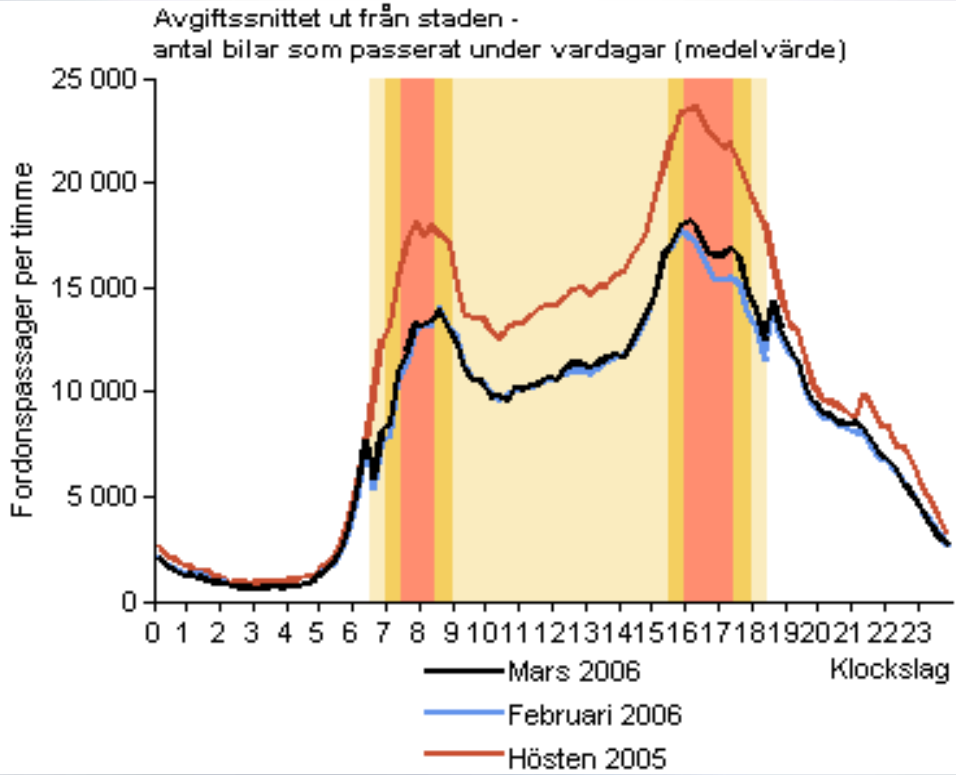
RESULTS – TRAFFIC IMPACT

Road traffic down 20-25%

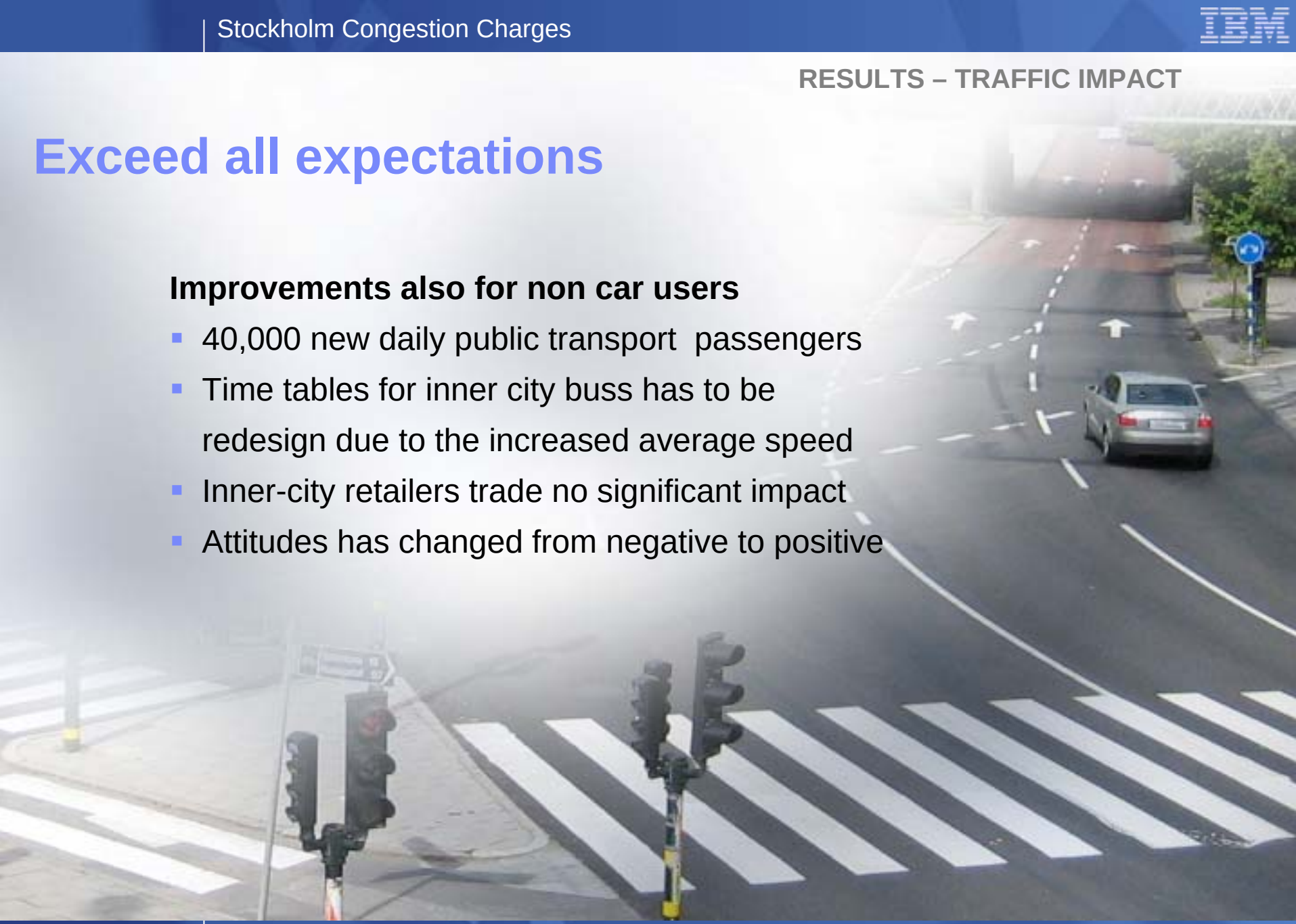


Redistributed traffic from the peek





Exceed all expectations



Improvements also for non car users

- 40,000 new daily public transport passengers
- Time tables for inner city buss has to be redesign due to the increased average speed
- Inner-city retailers trade no significant impact
- Attitudes has changed from negative to positive

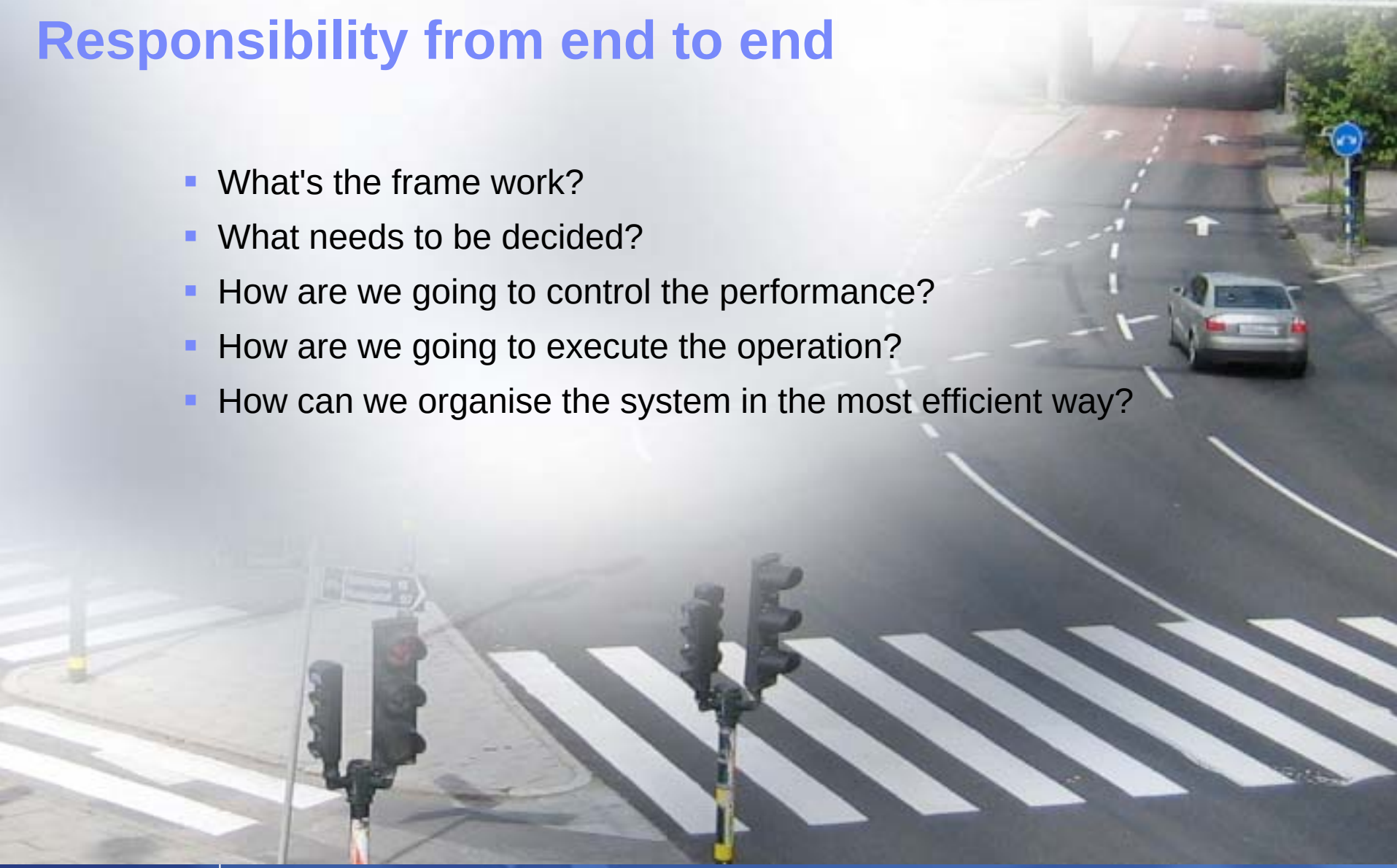
The Stockholm Congestion Charging Trial

DESIGN & IMPLEMENTATION ››

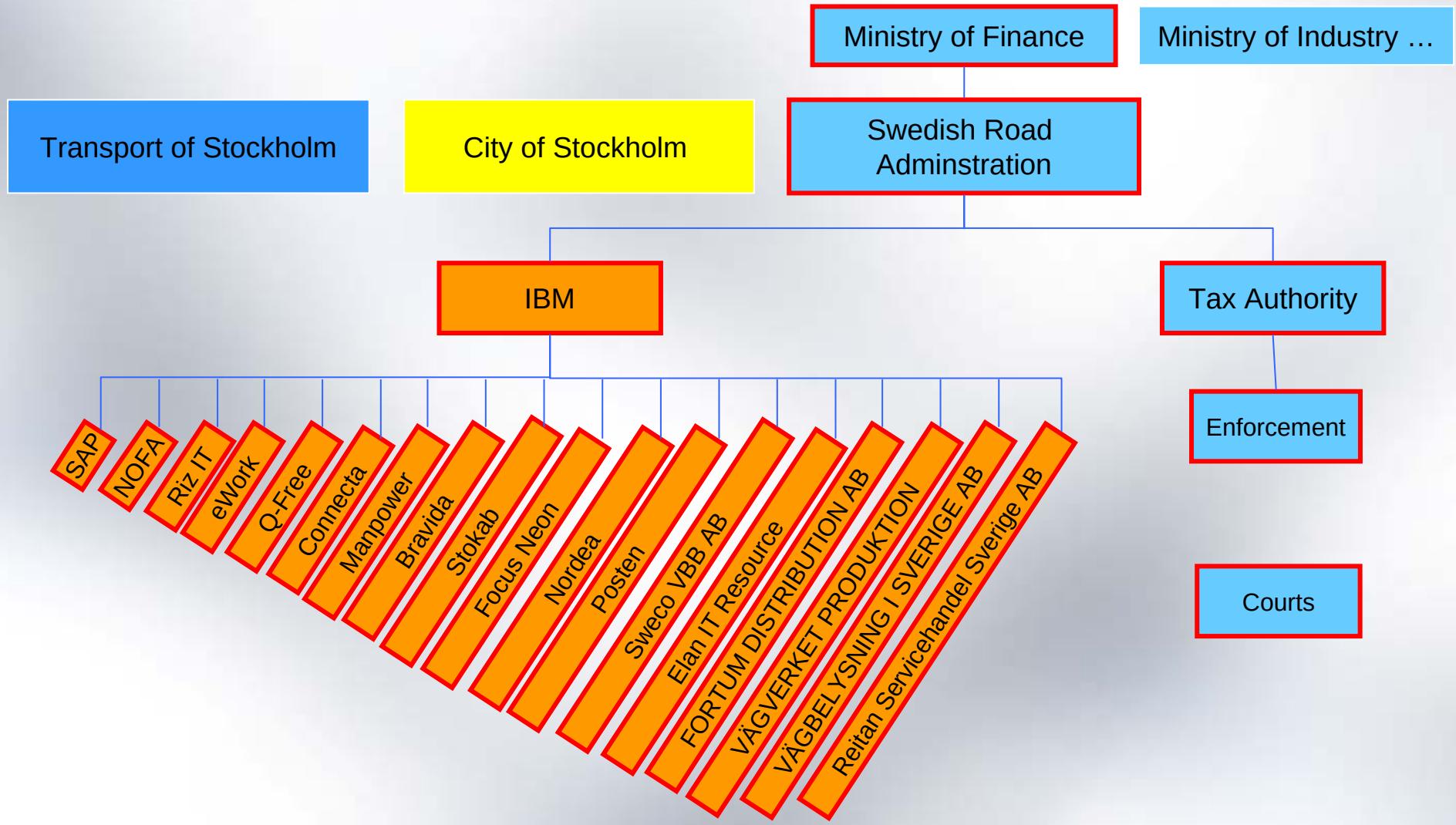
A holistic business approach

	Marketing	Customer Management and Care	Billing and Collections	OBU Production & Fulfillment	Service Management	Service Delivery	Business Management
Direct	Market and Brand Strategy	Customer Management and Care Strategy Channel Strategy	Tariff Strategy Billings and Colections Strategy	OBU Fulfillment Strategy and Planning	Supplier / Business Partner Strategy Service Mgmt Strategy	Technology Strategy Roadside Equipment Strategy External Impacts Monitoring & assessment	Strategic Enterprise Planning Supply Chain/Value Net Strategy
Control	Brand Management Marketing & Communications Mgmt Web content mgmt	Manage customer service operations Account Managment	Billing & Collections Management Fraud Management	OBU Production Planning OBU Purchasing and Inventory Management	IS / IT Support Services Mgmt Customer SLA / QoS Mgmt Supplier / Partner Performance Mgmt Availability, Capacity & Continuity Mgt	Programme & Project Mgmt Release & Test Mgmt Change Control Business Case Mgmt Enterprise Architecture Mgmt	Financial Mgmt Stakeholder and External Relations Mgmt HR Management Procurement Mgmt Risk Management Business Performance Mgmt
Execute	Marketing Research and Analysis Execute information and marketing campaigns	Customer Contact Operations Registration Enquiries Problem Handling and Resolution Appeals handling	Capture and Transmit Passages Rating Billing Collections Dunning Print and fulfillment	OBU Production OBU Logistics and Distribution OBU Device Installation OBU Returns and Servicing	Service Problem and Incident Mgmt Supplier/Partner Problem Rep & Mgmt End to End Solution Monitoring System, Network & Infrastructure Operations Configuration Mgmt Asset Mgmt Security Mgmt	Solution Design Roadside Equipment maintenance & change implementation Solution maintenance and change implementation Release & Test execution	Accounting & Ledger Operations HR Operations Procurement Operations Knowledge Mgmt Building and Facilities Mgmt

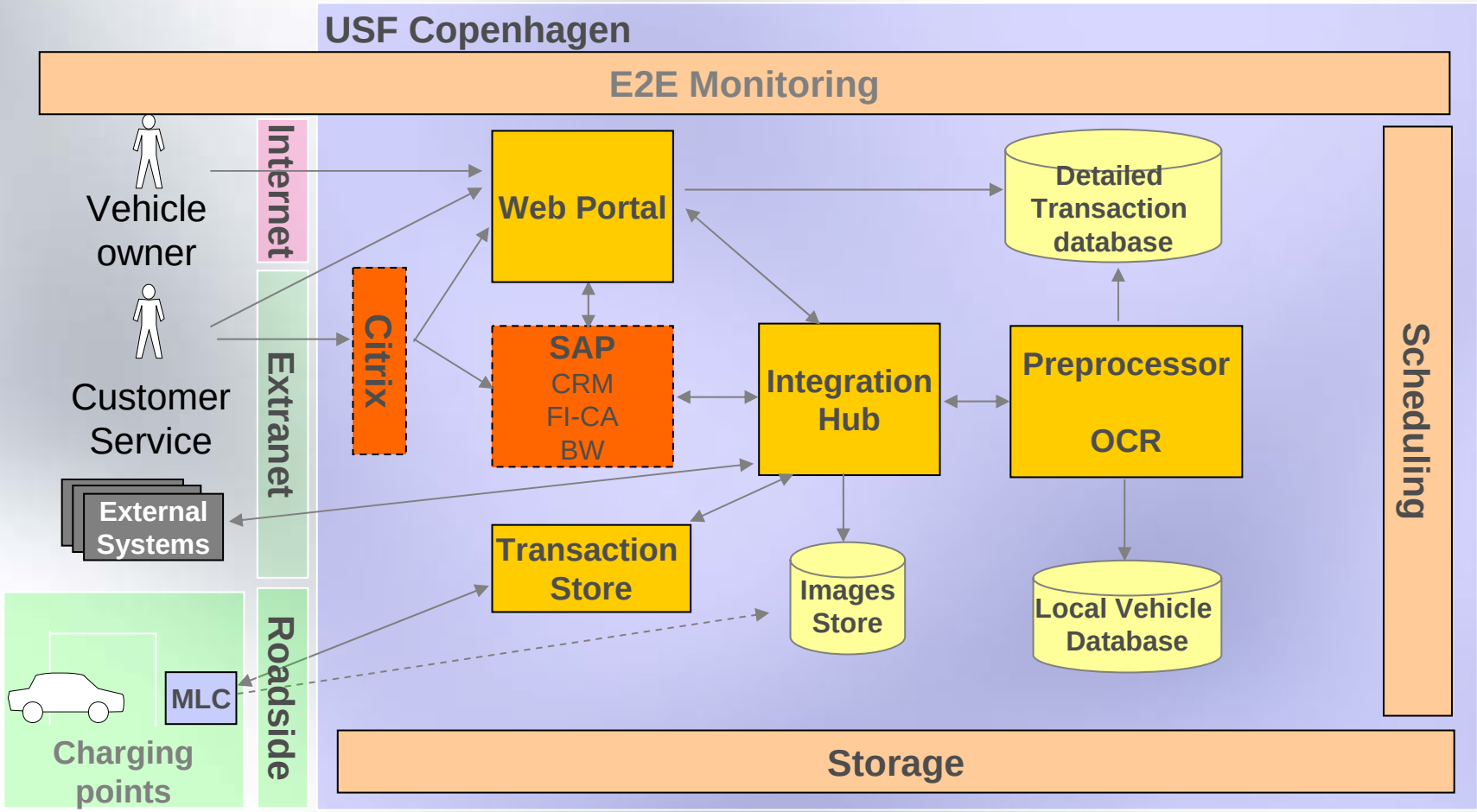
Responsibility from end to end



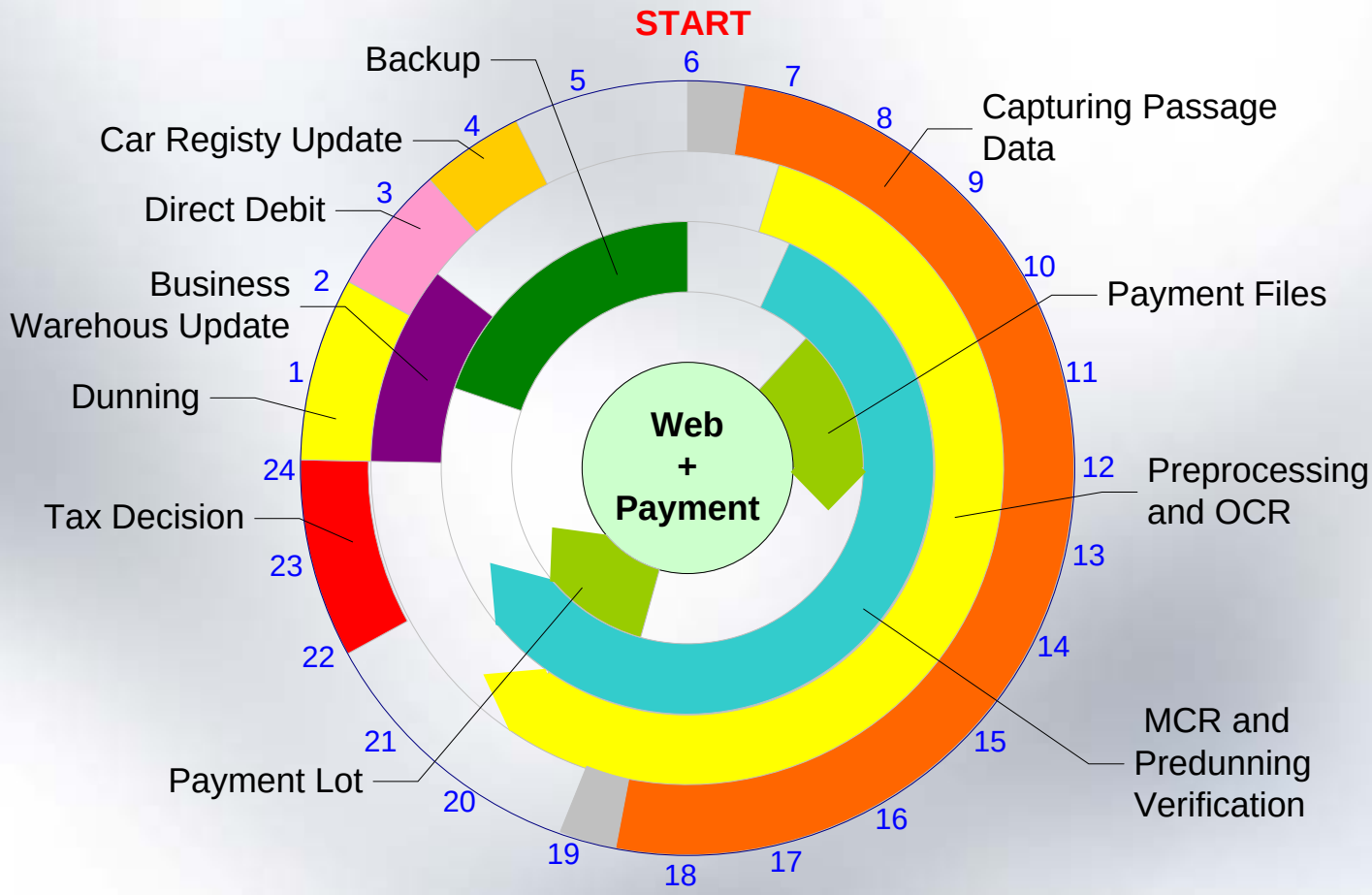
- What's the frame work?
- What needs to be decided?
- How are we going to control the performance?
- How are we going to execute the operation?
- How can we organise the system in the most efficient way?



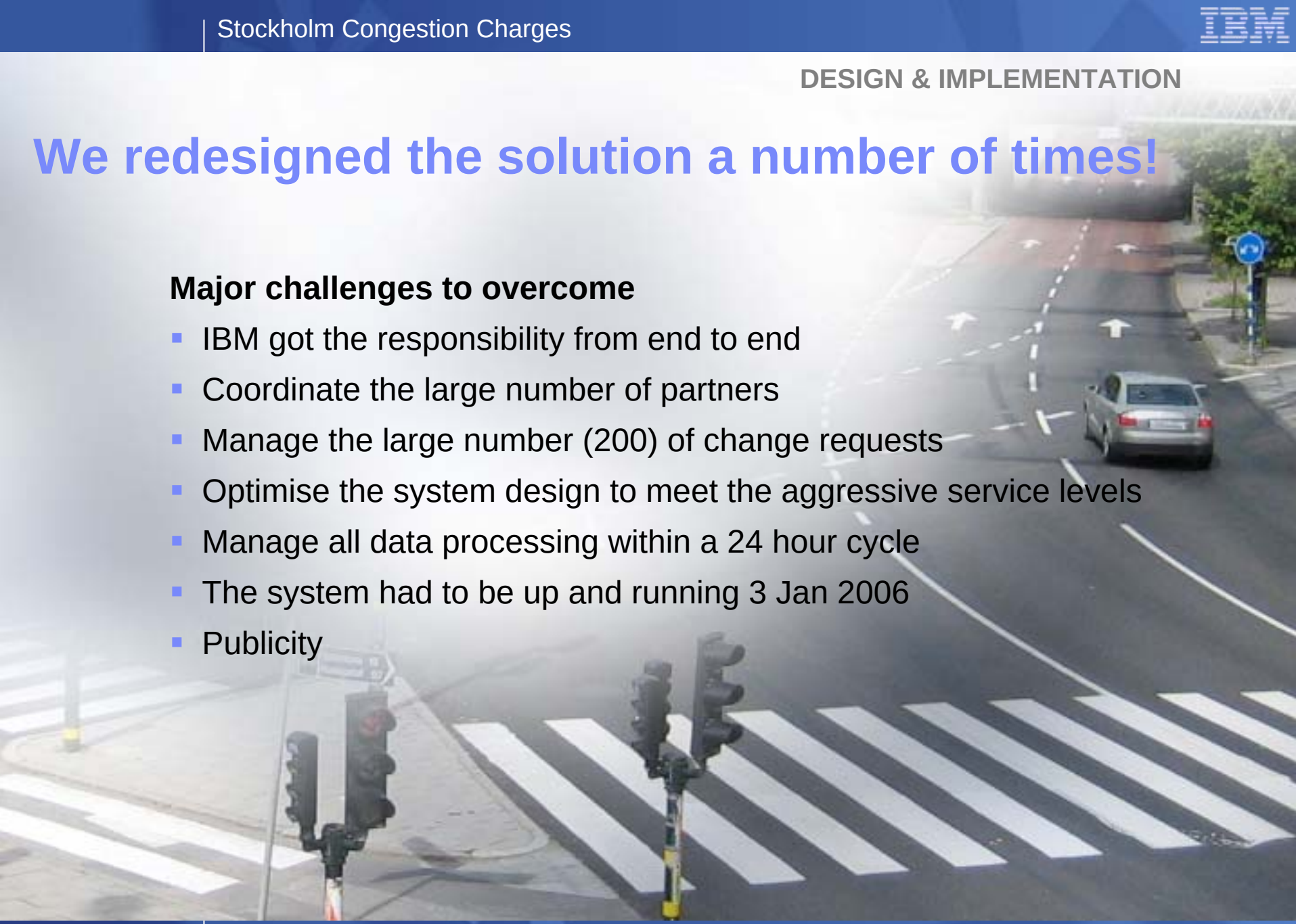
Architecture Overview



24 Hours Operational Cycle



We redesigned the solution a number of times!



Major challenges to overcome

- IBM got the responsibility from end to end
- Coordinate the large number of partners
- Manage the large number (200) of change requests
- Optimise the system design to meet the aggressive service levels
- Manage all data processing within a 24 hour cycle
- The system had to be up and running 3 Jan 2006
- Publicity

Reality VS Expectations

A normal day at work

Calls to the call centre	2,000	(30,000)
Charged passages	350,000	(500,000)
Tax decisions	110,000	
Reminder letter 1	3,650	
Reminder letter 2	1,200	
Complaints on charges	100	(1,000)
Legal appeals	6	(100)

Extensive media coverage

Before the launching date

Solution, transponders and project costs

Extensive media coverage

System launching day

Focused on the expected chaos

Extensive media coverage

One day after

Immediate positive press focused on the huge impact

Extensive media coverage

Some weeks after

System performance exceeds all expectation

Costs

What's driving the total cost?

- Exemptions rules
- Service levels
- Payment rules
- Transponders

Recommendations and lessons learned

Preparation phase

- Secure a strong political support & commitment
- Define clear objective
- Apply Road User Charging as part of an integrated transport policy
- Prepare regulations and legislation to support an efficient and user friendly system
- Procurement based on functional requirements

Delivery phase

- Use a simple and well proven technical solution
- Design a flexible and scalable solution based on open standard components
- Plan for the possibility of delays
- Effective marketing / public information campaign

Road Charging – Why IBM

Managing complexity

- Holistic approach
- Experience
- IBM Research
- Security/privacy
- Technology evolution
- Open standards

Contact details – Reference case contact

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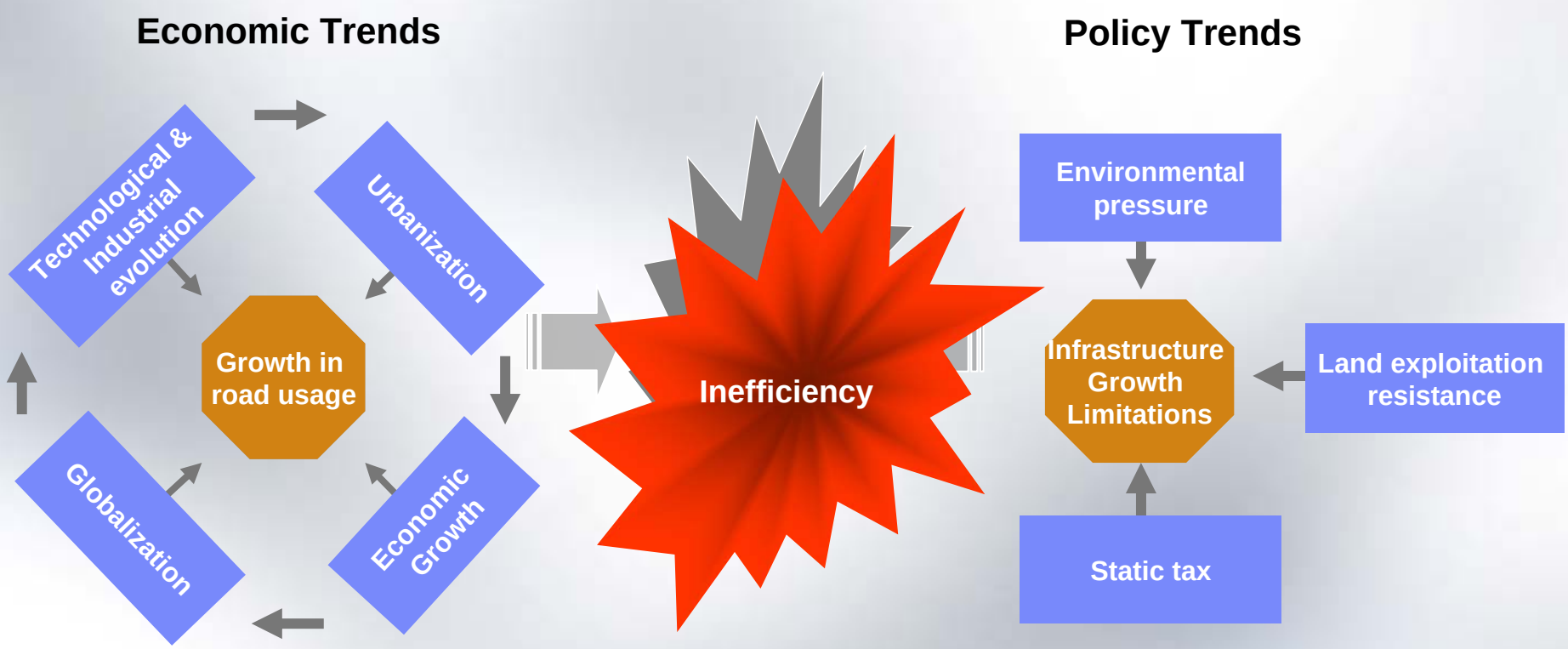
- **Videos**
  - *Winning the Road Game*
  - *Stockholm Congestion Charging Trial*
- **Planed RUC seminars**
  - Urban Futures conference, Stockholm May 3-5
  - Impact Conference, Stockholm June 29-30
- **Stockholm VIP client demonstrations**
  - Road side equipment (Bus tour)
  - Call centre
  - Central system
- **White Papers / Leaflets**
  - *Driving the future of road user charging*
  - *Congestion Charging White Paper*
  - *Stockholm Congestion Charging Trial leaflet*
- **RUC Knowledge card (IBM internal)**

The Stockholm Congestion Charging Trial

WHY IBM ››

A combination of economic trends and policy trends make the transport system inefficient, and there is no immediate relief in sight



IBM Vision for Europe – towards national road charges (cordon and distance)

Inter-urban road tolls

Tunnels &Bridges

New/wider roads

Congestion charging

Lorry road user charging

All vehicles/ All roads

Charging schemes in other cities

	Singapore	Oslo	London	Stockholm
Objective	Optimize the usage of road infrastructure.	Fund new road & public transport infrastructure projects	Reduce congestion 15% and fund investments in the London transport system	Reduce congestion 10-15%, improve the environment and fund increased public transport and Park&Ride
Pricing scheme	€0-2 per in bound trip; variable charge Monday to Friday 8:00 to 19:00	€1,5 per inbound trip; flat rate all days	€10 area charge per day, flat rate Monday to Friday 7:00 to 18:30	€1-2 per in and outbound trip; variable charge Monday to Friday 6:30 to 18:30
Payment	Pre payment Cash card and DSRC	Pre payment via DSRC or manually at road side	Pre payment manually	Post payment via DSRC & direct debit or manually (giro or retailer)
Enforcement	Camera and ANPR	Camera and MCR	Camera and ANPR	Camera and ANPR
Revenue per year	€40M	€130M	€270M	€85M
Future	GPS based system considered	Extension and variable pricing scheme considered	Western extension, DSRC pilot project	Referendum to decide to permanent or not

The Stockholm Congestion Charging Trial

BENCHMARKING ››

Differences and similarities

Solutions looks the same but are different

- Oslo don’t charge congestions
- London don’t have transponders
- Stockholm is a “state of the art” solution built on proven technology
- Singapore consider GPS solution for the future