



ITS og signalregulering

ITS and Traffic Signal Control

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Statens vegvesen Region midt

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ITS and Traffic Signal Control



Who thinks that Traffic Signal Control = ITS?

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ITS and Traffic Signal Control

- Traffic signal control was one of the first areas to utilize mainframe computers.



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Forenklet kapasitetsberegning

- Kombinasjon av faser og beregning av kapasitet

Ved bruk av den forenklete metoden er kapasiteten i formelen bare avhengig av antall faser i signalanlegget.

$$\text{Belastningsgrad} = \frac{\text{dimensjonerende trafikkbelastning}}{\text{kryssets kapasitet}}$$

Kryssets kapasitet med hensyn til dimensjonerende belastning settes til 1800 pbe/t minus 100 pbe/t pr. faseveksling i omløpet.

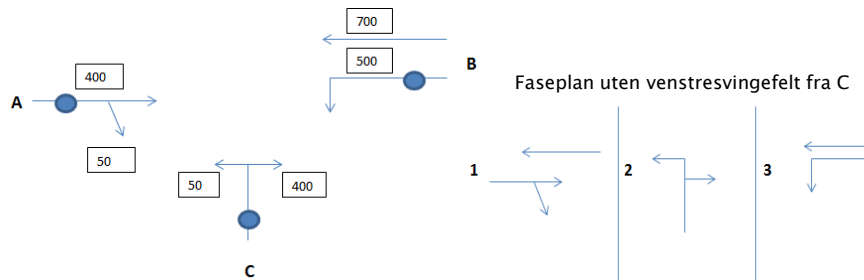
Forskjellene mellom ulike alternativer fremkommer ved at trafikkbelastningen i krysset fordeles på ulike antall felt og faser



Forenklet kapasitetsberegning



Uten venstresvingefelt fra C



Dimensjonerende belastning
 $450 + 450 + 500 = 1400$

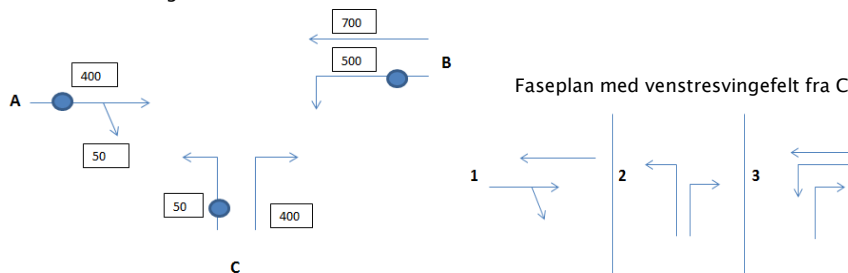
Kapasitet = $1800 - (3 \times 100) = 1500$
 Belastningsgrad = $1400 / 1500 = 0,93$



Eksempel på effekten av separat felt for en underordnet svingebevegelse



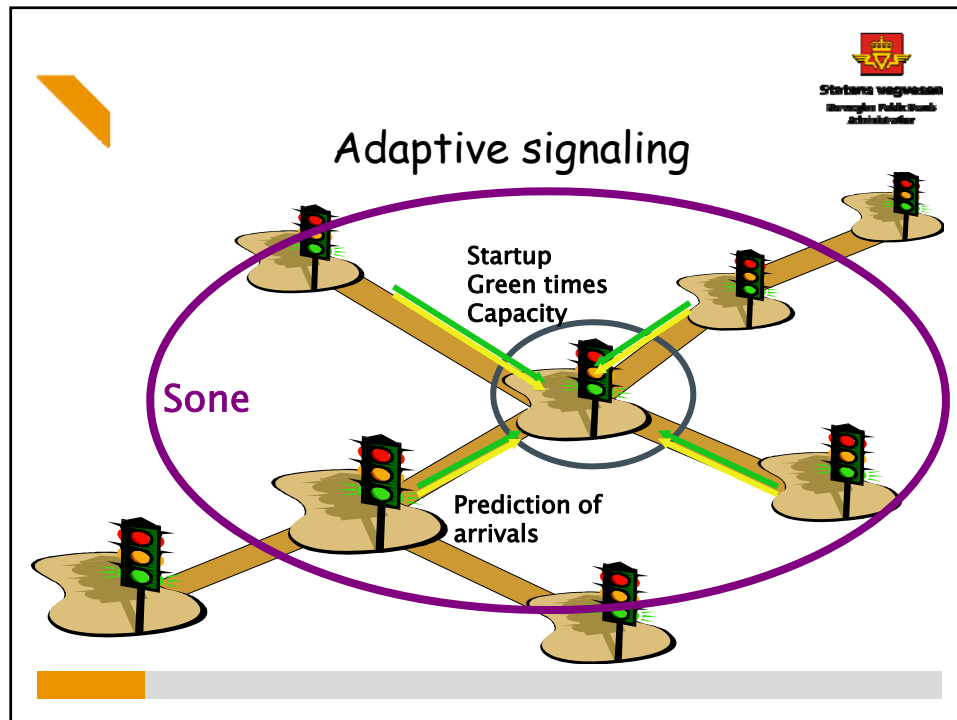
Med venstresvingefelt fra C



Dimensjonerende belastning
 $450 + 50 + 500 = 1000$

Kapasitet = $1800 - (3 \times 100) = 1500$
 Belastningsgrad = $1000 / 1500 = 0,67$





Who should we focus on here?



Airport bus without
detection

at stop line in 37 sec
485 sec delayed
priority route

at stop line in 0 sec
60 sec delayed
not priority route

at stop line in 41 sec
96 sec delayed
not priority route

10 sept 2014

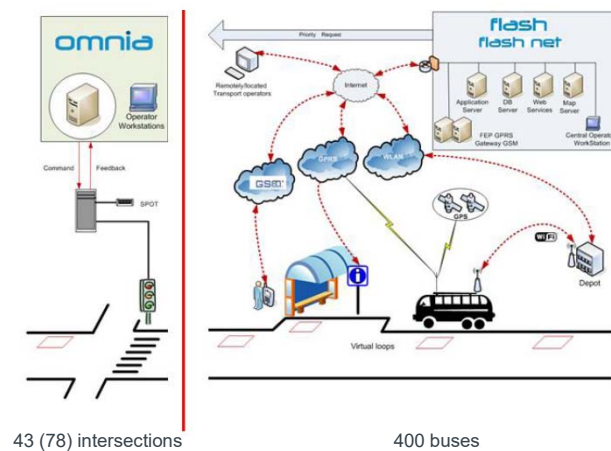
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Practical division and integration for the project

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Public Roads Administration

Operating company



43 (78) intersections

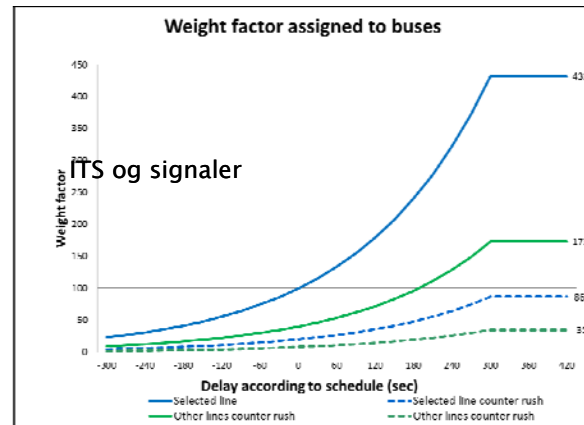
400 buses

10 sept 2014

Chosen priority for signaling

Priority regime:

- **Cars weights**
 - Stopped = 1
 - Driving = 3
 - Platoons = more
- **Pedestrian weights**
 - 2 up to 100
- **Bus up to 430**
 - Separates for:
 - 1) imp routes
 - 2) delay
 - 3) direction
 - 4) location



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Controllers in Trondheim



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Dynamisk informasjonsdeling i trafikken

Videreføring til kollektivtrafikk



- Flybussen melder sin posisjon
- Signalreguleringen lager prognose og prioriterer
- Tilbakemelding til sjåfør via TLA

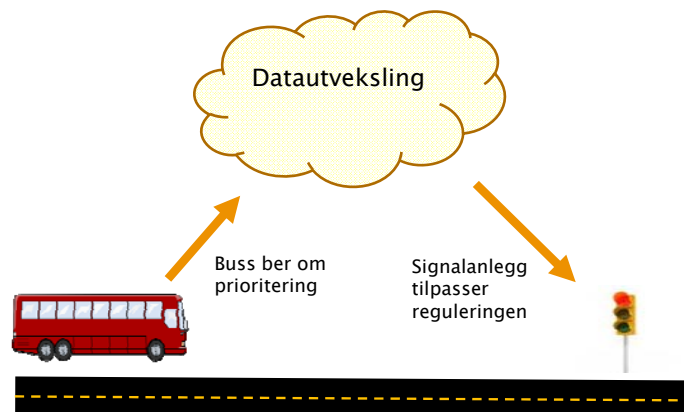


Vi kjører for deg!

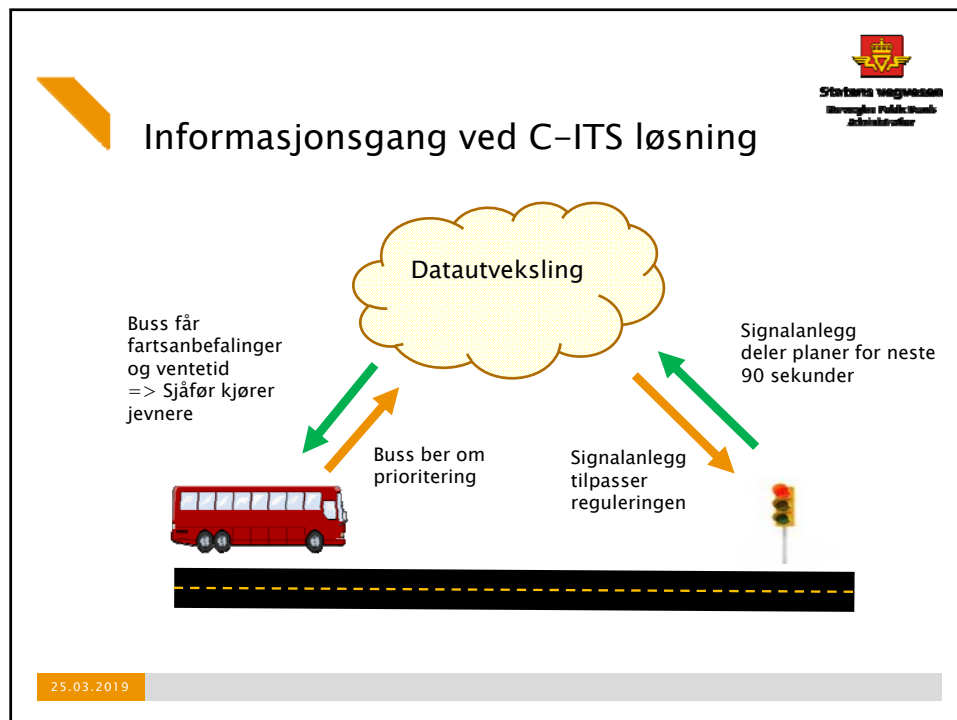
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Informasjonsgang ved prioritering



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Autonomous vehicles – sharing traffic signals

Statens vegvesen
Norwegian Public Roads
Administration

To gain experience with C-ITS the Norwegian Public Roads Administration are sharing traffic light signals in Trondheim. The project consists of two parts

- Facilitation of data signaling
 - Our responsibility, important to gain experience with the installation and operation
- Use of data from signaling
 - Managed by the market, important to acquire safe solutions

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Traffic signals in the vehicle

- Through sharing the traffic signal status and planned shift, a vehicle knows if it must stop or can pass freely at a selected speed.
- Information sharing in the installation in Trondheim is based on cellular communication between the vehicle and a back-end solution
- We have established an solution open for utilization from February 2016 to 2017 (as a start).

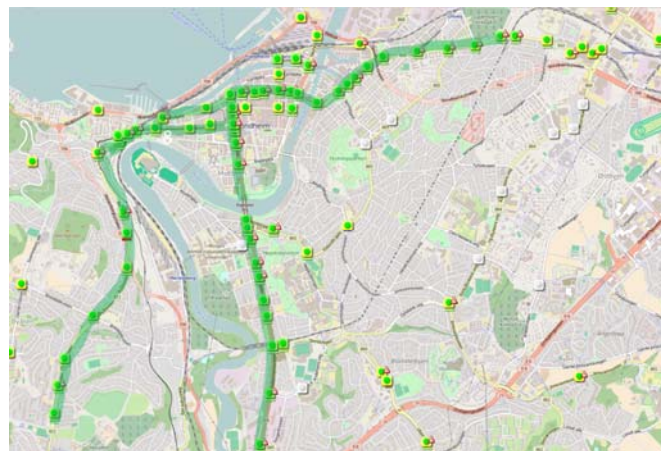


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Statens vegvesen
Trondheimsregionen
Admistrasjon

Traffic light assistance in Trondheim – 48 intersections is online



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Information sharing

- We share information with both individual vehicle (apps) and car manufacturers (backend to backend)
- Big difference to serve 19 car manufacturers and potentially up to 100,000 users



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Traffic signal into the vehicle

- NPRA cooperate with Volvo to show recommended speed and countdown to green signal (figures on the right)
- Speed recommendation shall take into account the time to signal changes, distance to the stop line, use of turn signals, speed of cars in front etc.
- The goal is that the car should react to information and adjust it's speed or stop on its own – and not leave this to the driver.





Samarbeid med Volvo – enkel visning



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Statens vegvesen
Bergen Public Road
Administration



Thanks for the attention!

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