

Dimaps Route optimization

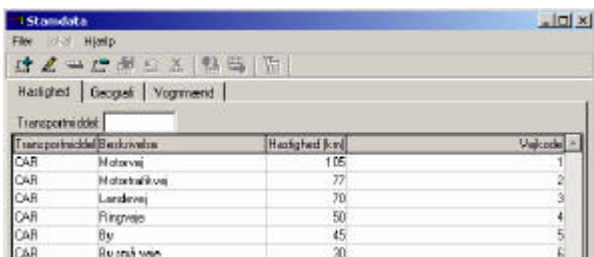
Dimaps has developed a unique multipurpose tool for route planning. To illustrate this we will use a company that uses our tool to plan and execute distribution of groceries (vegetables/fruit) to consumers in a subscription system. The tool can however be used to all forms of package delivery or courier service.

The tool is based on the three standard systems: Progress, MapInfo and RouteWare. The underlying map data is DAV-data and DDO[®] vektor.

Based on customer- and subscription-databases the tool automatically plan deliveries via individual vehicles based on package weight, maximum number of packages or maximum legal permitted driving time, supplying detailed maps and route-lists, loading and unloading lists with an exact time-limit per drop. In all, a complete route planning and optimization tool for medium and large operations.

Basedata for route optimization

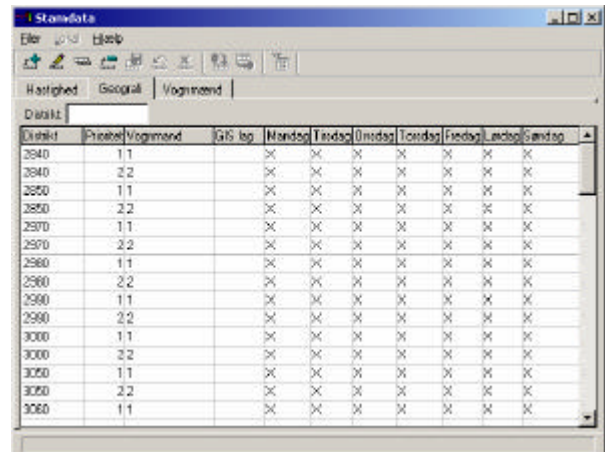
Geographical districts form the base for route optimisation. A simple set of districts could be the use of zip/postal-codes, which can be assigned automatically. A more advanced method of dividing into districts can be created using MapInfo. Each district should have a size corresponding to the area that can be covered by a single vehicle. A vehicle can be assigned to several districts, but not vice versa.



Transportmiddel	Beskrivelse	Hastighed (km)	Vejkode
CAR	Holstevaj	105	1
CAR	Holstevajvej	77	2
CAR	Landsvej	70	3
CAR	Fingvej	50	4
CAR	By	45	5
CAR	By midt veje	30	6

In the basedata it is possible to indicate individual speed for all vehicles.

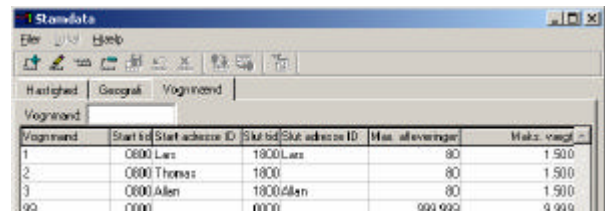
If the volume of packages vary on a day by day basis, it is possible to optimise by using "grids" consisting of districts of varying size.



Distrikt	Probet	Vognmand	GIS log	Mandag	Tirsdag	Onsdag	Torsdag	Fredag	Lørdag	Søndag
2840	1.1			X	X	X	X	X	X	X
2840	2.2			X	X	X	X	X	X	X
2850	1.1			X	X	X	X	X	X	X
2850	2.2			X	X	X	X	X	X	X
2870	1.1			X	X	X	X	X	X	X
2870	2.2			X	X	X	X	X	X	X
2880	1.1			X	X	X	X	X	X	X
2880	2.2			X	X	X	X	X	X	X
2890	1.1			X	X	X	X	X	X	X
2890	2.2			X	X	X	X	X	X	X
3000	1.1			X	X	X	X	X	X	X
3000	2.2			X	X	X	X	X	X	X
3050	1.1			X	X	X	X	X	X	X
3050	2.2			X	X	X	X	X	X	X
3060	1.1			X	X	X	X	X	X	X

In the basedata you assign each vehicle to a locality and assign a priority to the vehicles..

Each vehicle can be defined with start/end time, maximum payload and a defined start and end location for purposes of route optimization.



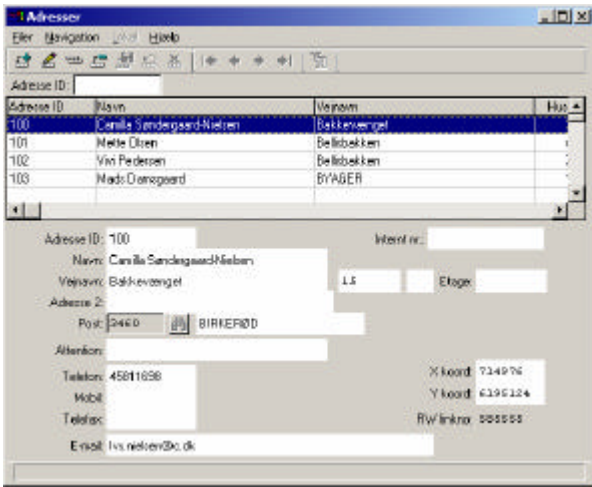
Vognmand	Start tid	Start adresse ID	Slut tid	Slut adresse ID	Max. aflæveringer	Max. vægt
1	0800	Lars	1800	Lars	80	1.500
2	0800	Thomas	1800		80	1.500
3	0800	Allen	1800	Allen	80	1.500
99	0000	0000	0000	0000	999.999	9.999

In the basedata the payload, availability and maximum number of drops is defined for each vehicle.

Each delivery is created as a package with a unique identification (this can be assigned automatically).

Route Optimisation

A minimum of recipient and a description must be defined for each package.



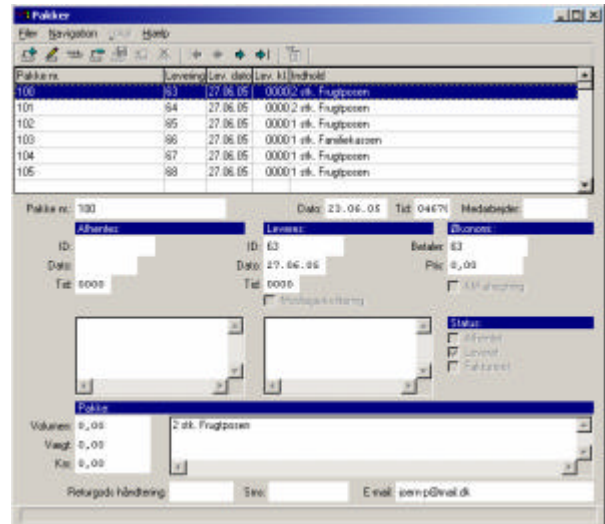
The address database can be populated by entering and maintaining addresses manually or addresses can be imported from a customer- or subscription-system.

Based on address information a recipient database is created. This database is 'geo-coded' enabling the storage of geographical information for the addresses.

This geo-coding is done just once, enabling speedier optimisation for multiple deliveries to same addresses. At the same time special notes can be assigned for the address – e.g. "deliver package by the stairs behind the house".

Daily routines

Packages are created either manually or they are imported by file or direct integration with an external data source. In the production module the data, id and eventual title for the production run is assigned. The id is by default set to 1, meaning "first delivery run of the day". Subsequent deliveries on the same day will be assigned incremented numbers.



The package database can be populated manually or information can be imported from a subscription-system.

The "Black box" performs the following:

- Pulls recipient information from datasource and checks for new or altered recipients.
- New recipients are geo-coded and addresses that cannot be geo-coded automatically are flagged, an error-list is then printed for manual handling.
- Each delivery is created as a package (N.B, ONLY for deliveries where recipient could be properly geo-coded).
- Individual vehicle usage is calculated for the given day and district.
- Package and vehicle information is saved in a log for later use.

When the "Black box" is done, the system is ready to:

- Print a delivery summary per day.
- Display/print drop-off lists for each vehicle in delivery order.
- Package note for each package (with optional barcode integration)

Route Optimisation

Upplysning	Uppg.	Person	Steg	Km (logget)	Telefon
Kurs	1	Lars	08	40,142 40	112 00
Kurs	2	Thomas	3	1,84 80 80	00 00
Kurs	1	Lars	78	121,82 82 26	12 38
Kurs	1	Lars	08	20,787 82 40	18 26
Kurs	2	Thomas	12	20,11 80 24	09 09
Kurs	1	Lars	08	121,42 82 40	11 40

Salvare	Km	Titel/Adress ID	Navn	Postboks	Postnr	Adr 4
1	8.08.08.06	Lars	Lars	Øregrovevej 132	2400	-
2	8.08.08.08	40	Sabir Nadek Clau Jacobsen	Øregrovevej 132 st tv	2400	-
3	8.08.08.03	39	Wolton Lars	Stokløse 48	2400	454
4	1.28.08.08	74	Erling Jørgensen	Pomeroyvej 176	2400	454
5	8.02.08.11	53	Louise Pedersen	Lysløkkesvej 11	2400	320
6	8.14.08.13	82	Nina Olsen	Lysløkkesvej 1	2400	454
7	8.02.08.16	54	Louise Langgaard	Lindesvejvej 200	2400	454
8	8.43.08.19	70	Jesper Sørensen	Skovgårdsvej 23	2400	454
9	8.19.08.22	89	Kirsten Pedersen	Bakkevej 190 1 tv	2400	454
10	8.05.08.25	95	Marianne Jørgensen	Hundestationen 11	2400	454
11	8.05.08.26	97	Jens Petersen	Hundestationen 26 1 tv	2400	454
12	8.05.08.31	96	Lene Nielsen	Hundestationen 2 1 tv	2400	454
13	8.05.08.25	61	Sigge Mads Sædelshøj	Hochangspæsten 22	2400	330
14	8.25.08.38	128	Alan Elias	Hochangspæsten 23	2400	330
15	1.08.08.43	62	Sofie Bruus Larsen	Abildstøpsvej 32	2400	454
16	4.08.08.51	64	Pernille Madecsen	Hvadsmøllen 5	3530	-
17	3.48.08.58	83	Christoph Hønskjole	Stroevvej 136	2400	454
18	8.28.08.08	80	A. Pjølsten ApS	Stroevvej 32	2400	454
19	8.08.08.03	65	Lise Petersen	Øregrovevej 24	2400	454

When the optimisation is run, the packages are automatically assigned to individual vehicles, creating the drop-off list per day with detailed drop times, detailed maps, load and unload lists, length of combined route and delivery times for each vehicle. See examples of drop-lists and maps in Appendix A and B.

Information can be added to each list or package, packages can be deleted etc. The production list can be regenerated. It is possible to engage a manual override to the calculated drop-off order.

Post production.

At the end of the day, changes in actual deliveries and undelivered packages are registered. After this update, the day's deliveries are closed and registered and during this process the program will:

- Re-calculate the route
- Save actual drop-offs in the log
- Calculate and update the vehicle log with kilometres driven, number of drop-offs and time.

The purpose of these calculations is to enable calculation of billing for the vehicle operator.

The system may be expanded with:

- Barcodes
- Registering of pick-up and drop-off times
- Receipts for deliveries
- Submission of SMS or e-mail with expected delivery-time etc.

Short description of database

Package database (Created manually or by importing data):

- Package id.
- Registration date
- Registration time
- User (entering data)
- Pickup address (Phone, Name, Address 1, Address 2, Zip, City, Attn, GIS X, GIS Y)
- Pickup date
- Pickup time
- Pickup note
- Delivery address (Phone, Name, Address 1, Address 2, Zip, City, Attn, GIS X, GIS Y)
- Delivery date
- Delivery time
- Delivery note
- Payee (Phone/customer no.)
- E-mail for messages
- SMS-no. for messages
- Content description
- Weight
- Volume
- Forced sequence no.
- Transport price
- Payment by km Y/N
- Delivered Y/N
- Invoiced Y/N
- Vehicle invoiced Y/N
- Recipient receipt Y/N
- Handling of return (Return/retry delivery)

Recipient database (Created manually or by importing data):

- Phone
- Internal id
- Name
- Address 1 (roadname, house no., house marking, floor)
- Address 2
- Zip
- City
- Attention
- E-mail
- SMS
- Note
- GIS X coordinate
- GIS Y coordinate

District database (Basedata):

- District
- GIS layer
- Vehicle
- Weekdays

Production database (Created automatically by Black box at production run):

- Date
- No. (route number)
- Note (description)
- District
- Vehicle
- Sequence
- Package id
- GIS X
- GIS Y
- Interval kilometres
- Interval time
- Droptime

Vehicle database (Basedata):

- Vehicle
- Start time
- End time
- Max. Drop-offs
- Max. Weight
- Start address (Phone, Name, Address 1, Address 2, Zip, City, Attention, GIS X, GIS Y)
- End address (Phone, Name, Address 1, Address 2, Zip, City, Attention, GIS X, GIS Y)

Delivery log (Created automatically):

- Package id.
- Vehicle
- Date
- Time
- Event (pickup/drop/reload/return etc.)

For further information, contact Dimaps on phone +45 21 45 10 09 or by email: sales@dimaps.com