

New (?) challenges in road networks management

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SCENARIO

During the last 10 years road networks have been transformed

from pure **interconnection systems**
to integrated **mobility services**.

The most relevant effects of this process are

- fast **growing investments** in technologies
- dramatic **change in** road management **approach**.

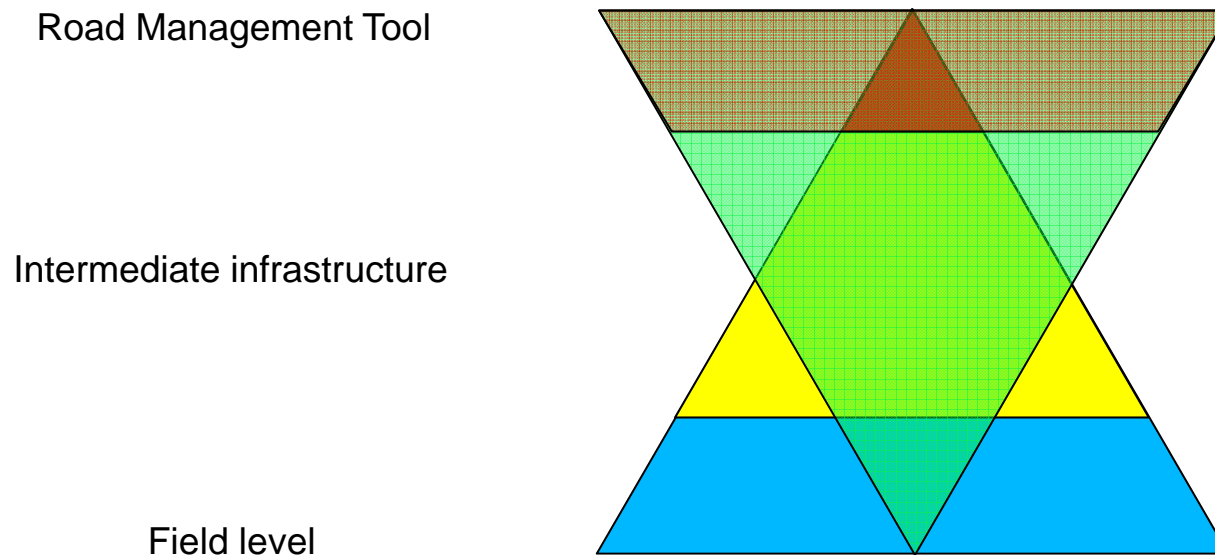


INVESTMENTS

A typical diagram of technology implementation cost looks like this

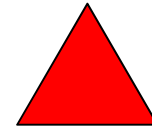
In terms of value for money (ROI) we can expect something like this

A small part of the investment produces a large parte of the overall return



FOCUS ON VALUE

The **Network Management Tool** must be:



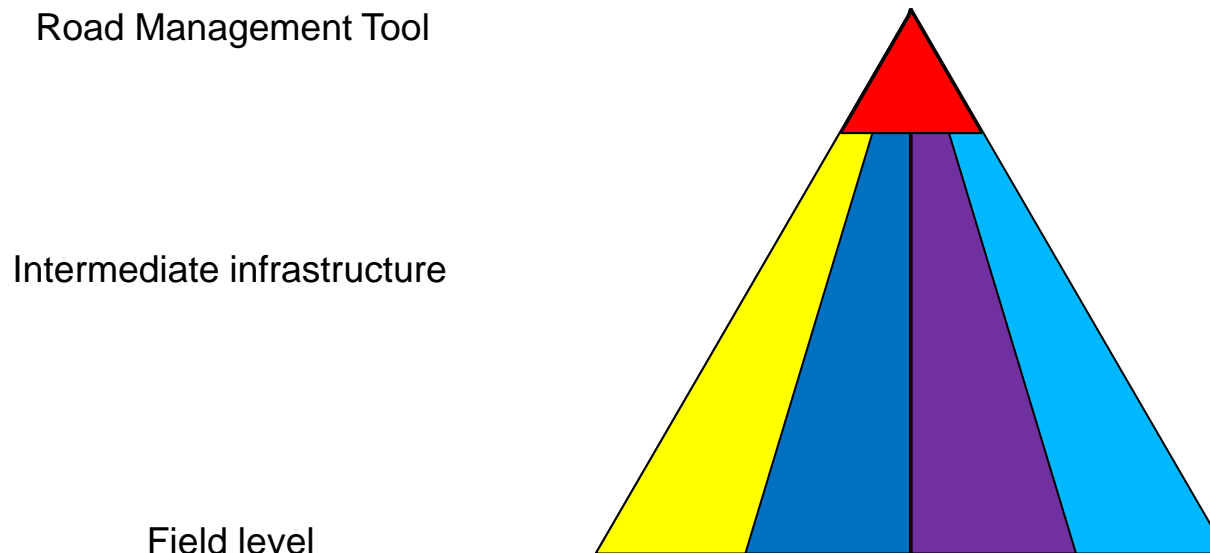
- **Flexible** – in order to meet organisation requirements for a long time
- **Integrated** – single DB, all data available to all applications at any time
- **User configurable** – I can describe my roads, my technologies, my communication network, my organisation, my procedures, my DSS, my publishing policies, etc...
- **Technology independent** - all field devices can be integrated no matter which is the specific manufacturer
- **Accessible** – from any standards device having network access rights
- **Licence free** – not to be tied to suppliers commercial policies
- **Completely open** – not to be tied to original system supplier

SYSTEM DESIGN

Unfortunately most of the projects looks like this
where each triangle represent a different technology.

The most valuable part of the investment will result heterogeneous and far from expected

In my opinion the overall system design should look like this

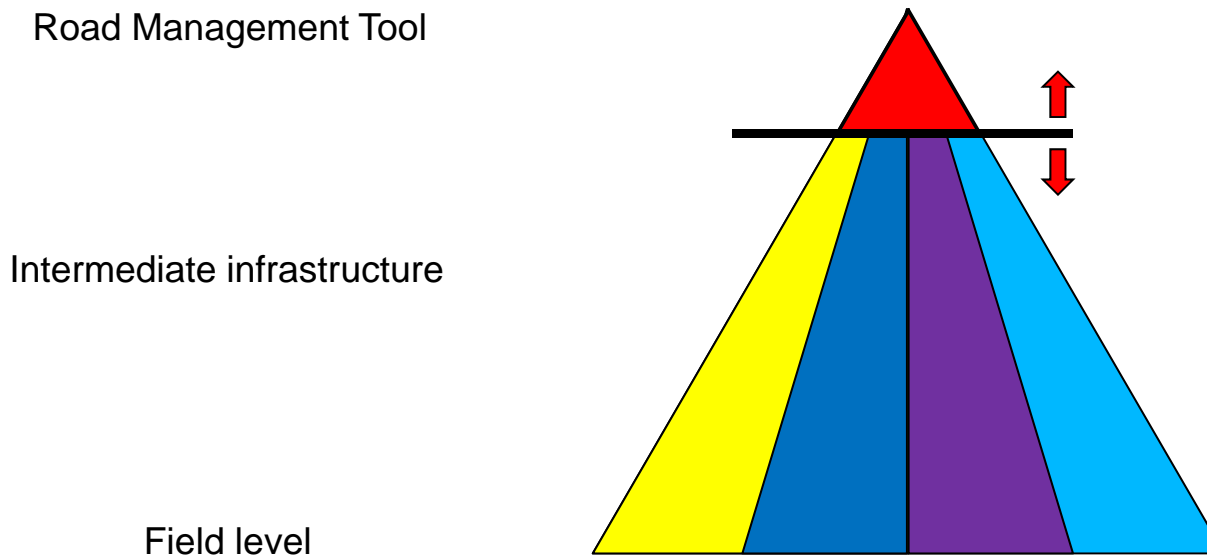


THE BORDER

Where to put the boarder ?

In my opinion there is a simple rule:

The Road Management Tool has to extended as far as the data you have to deal with are “VIRTUAL”.

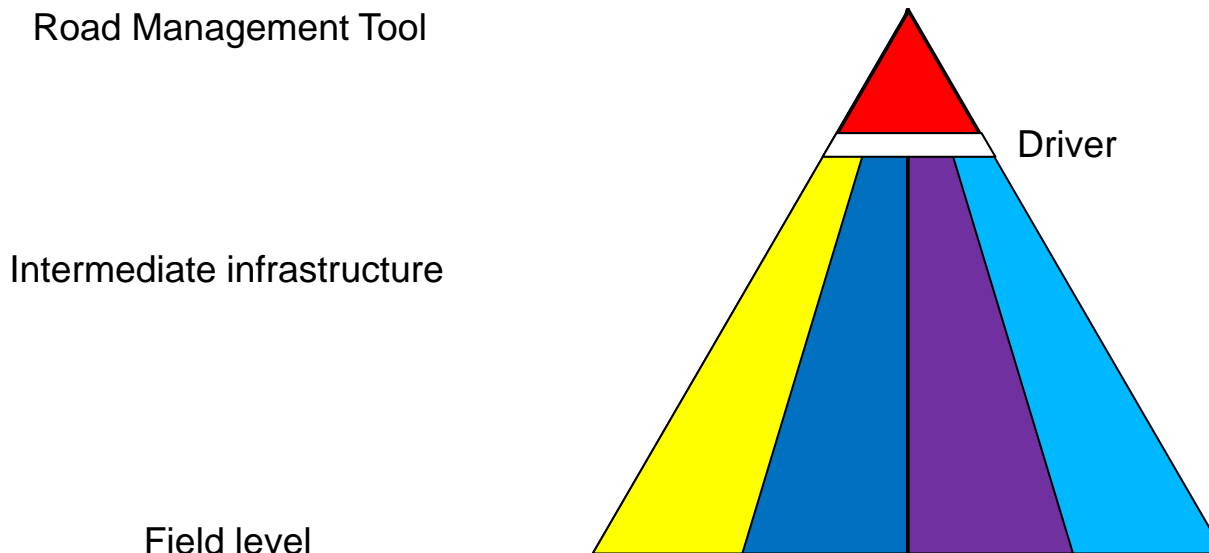


THE BORDER

How to manage the boarder ?

There are two possible approach:

- **Define a standard interface (the NTCP approach)**
- **Accept a very simple software layer (“Driver Layer”) which translate virtual data to hardware dependant data and vice versa.**

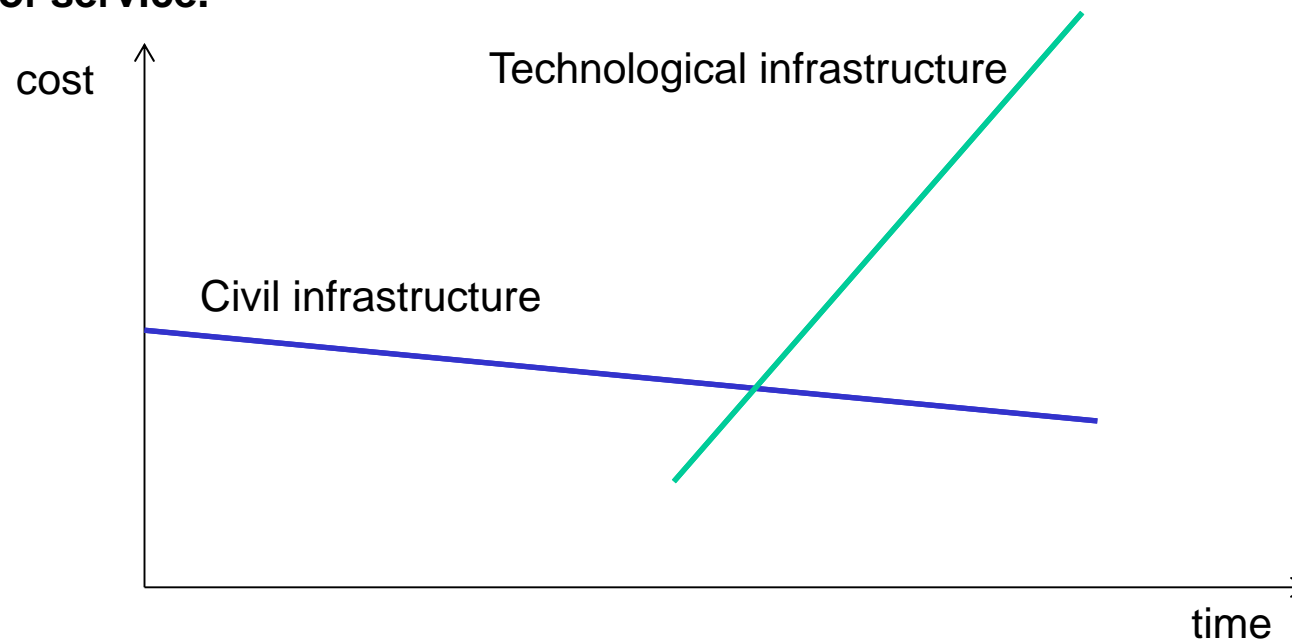


MAINTENANCE PUZZLE

Maintenance cost shows typically a shape like this:

This is due to different factors:

- **The growing dimension of technological infrastructure**
- **The absence of a “design for maintenance” strategy**
- **The cultural approach**
- **The externalisation of the activity without the capability to define an adequate level of service.**



PUZZLE SOLUTION

For the **growing dimension of technological** infrastructure the Road Management Tool approach gives a significant contribution in terms of:

- **Data Management** – each object is defined only once for all purposes (operation, diagnostics, supervision, maintenance, spare parts stock, etc...)
- **Personnel Training** – unique man-machine interface philosophy constant in time
- **Evolutive software development** – a new application is simply a new way to browse the data.

PUZZLE SOLUTION

For the **absence of a “design for maintenance” strategy** the solution is not straight foreword but is not complex in principle.

During the design phase, maximum care has to be taken in applying a simple rule:

Each single piece of the system MUST have the capability to detect ANY change in it's own status and to communicate it.

Just an example: I never saw any single project or tender specification that, for a video camera, requires the transmission of messages like:

- **I am dirty !**
- **I was cleaned up !**
- **I have been moved !**

the impact of this kind of functionality, in fact not so difficult and not so expensive to implement, is dramatic in terms of global life cycle cost: **the possible saving is by far higher than the original device cost.**

PUZZLE SOLUTION

Any intervention on **cultural** aspects has to face human behaviour organisations rigidity. Moving from constructing roads and take care of asphalt to providing added services to road users, is a tough task, but change the way maintenance is planned and performed can be also harder.

The traditional way to maintain roads: cyclic verification and intervention, when applied to technological infrastructures, result in

- **High cost** – most of the performed activity is probably not necessary and not urgent
- **Low system availability**

The challenge is to solve an equations system that requires, on one side, to **maximise overall system availability**,

and on the other to

minimise a complex “cost function”

depending not only on actual economical costs (maintenance itself and yards), but also on traffic perturbation, users time loss, risk, etc...

PUZZLE SOLUTION

The combination of what suggested in previous pages will give a straight forward solution also to the **externalisation problem**.

Obviously all that is possible (not necessarily easy) having a detailed knowledge of processes and technologies, and of their actual behaviour in field.

In other word **integration and data availability are once again a success key**.

RMT | GET SMART
AND INNOVATIVE



Thank you.

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