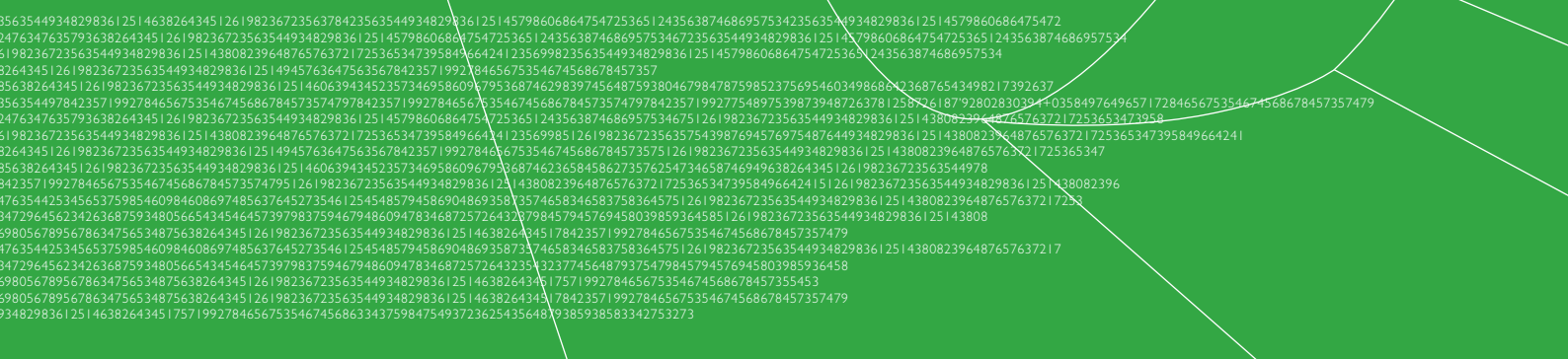
erex

by
eress

READY TODAY FOR THE RAILWAYS OF TOMORROW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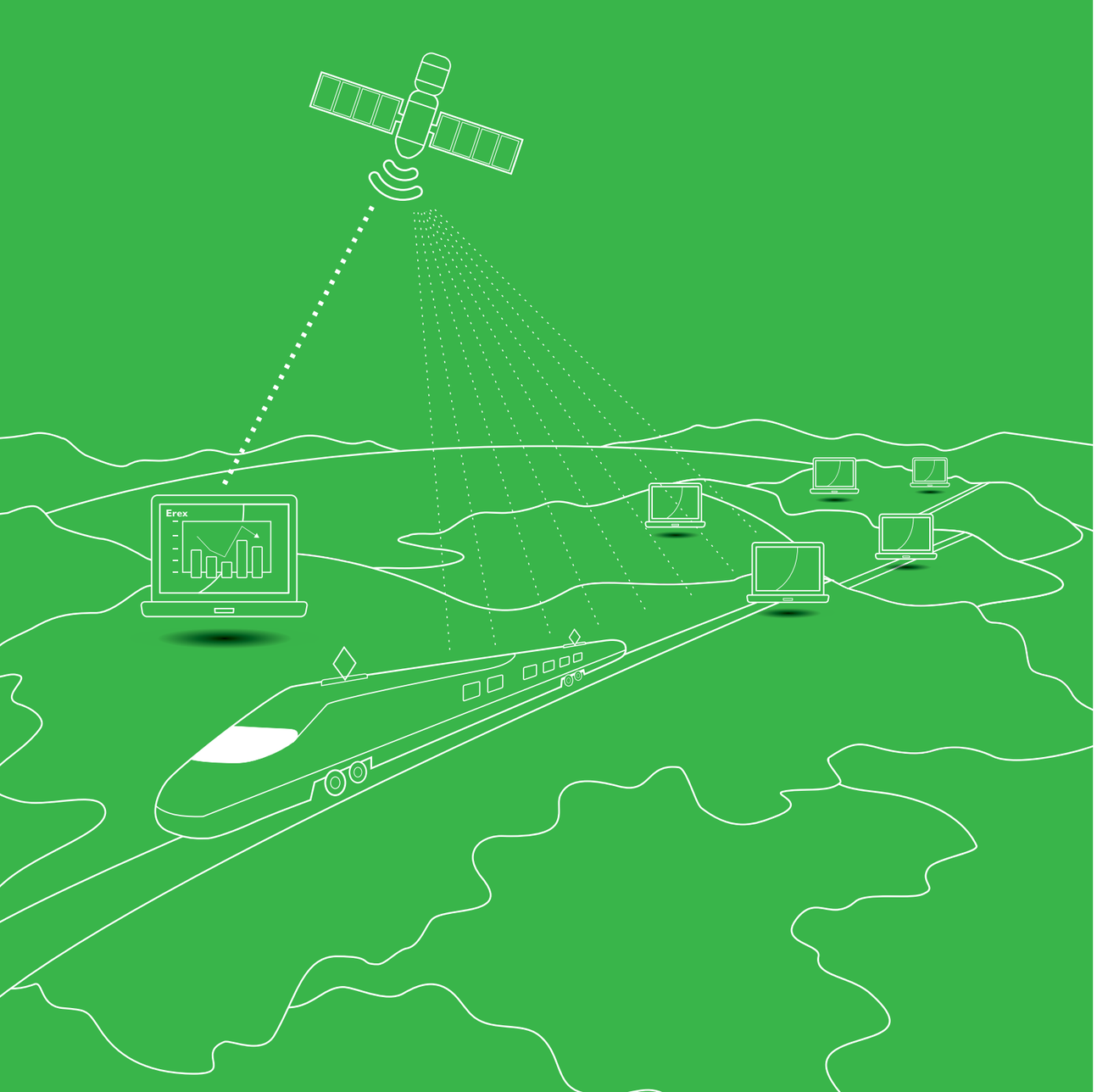
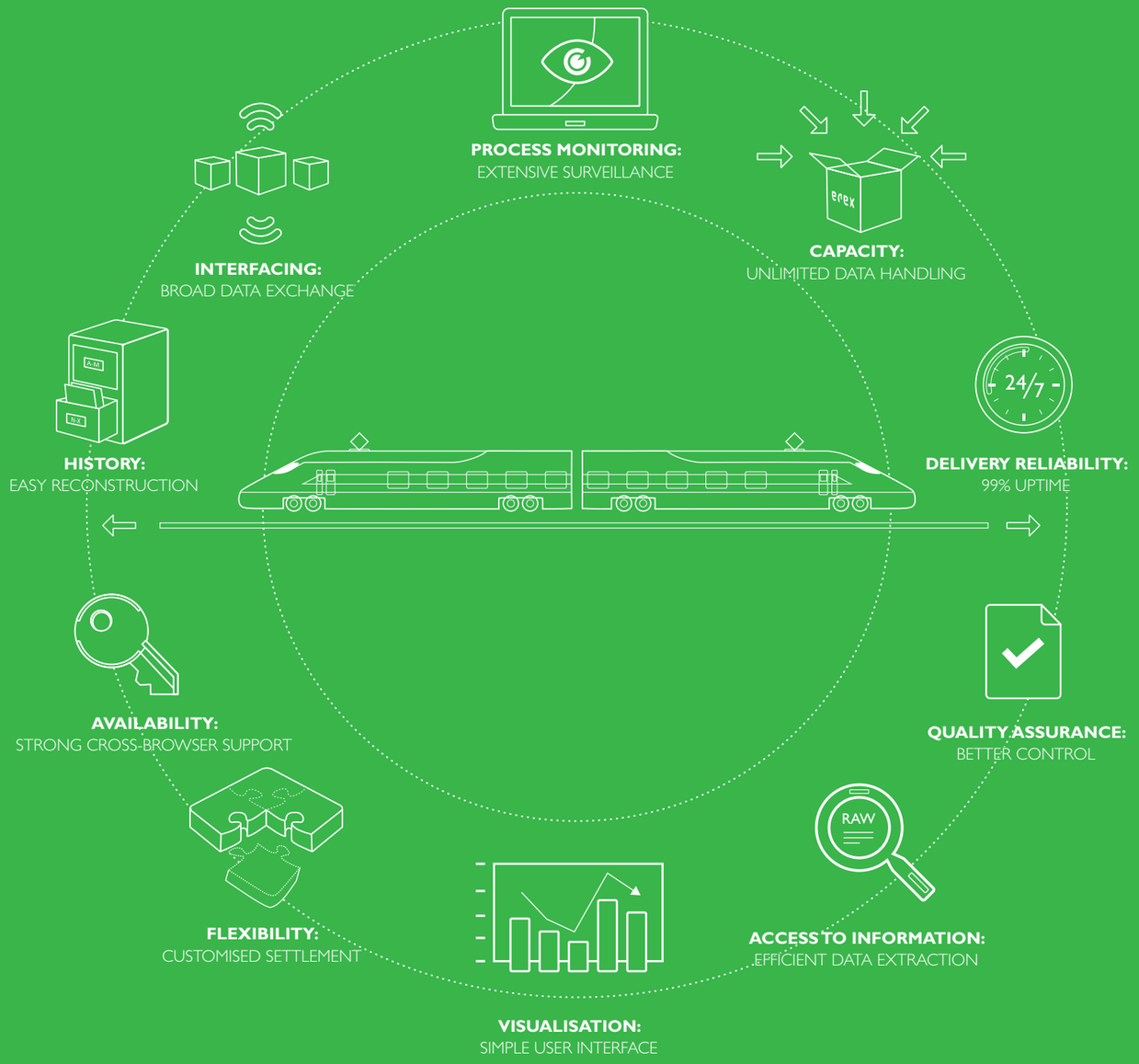


Eress
Leading the way in railway energy settlement together

Eress is a partnership between Banedanmark, Infrabel, Jernbaneverket and Trafikverket. Eress is a non-profit organisation, jointly owned by its partners, committed to the development, implementation and supply of the energy settlement system Erex.

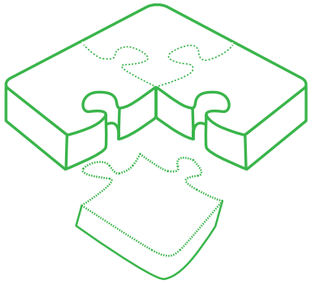
Eress is an open partnership for infrastructure managers. Eress decided that from April 2012 there won't be any entrance fee to become a new Eress partner.



Erex

Helps railways save money and reduce CO2 emissions by providing exact energy consumption data.

Erex is the leading railway energy settlement system available. It provides an efficient, reliable, accurate and flexible energy settlement process. This enables our partners to fulfil requirements for a neutral and non-discriminatory operation, and railway undertakings to understand their use of energy and thereby save energy and costs.

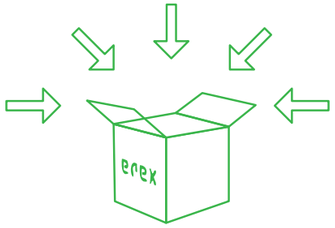


"Erex has been customised, not just for the current situation, but for any future changes as well"

Dyre Martin Gulbrandsen, Eress

Flexibility:
Customised settlement

Legislation, regulations and requirements vary from country to country, and they are also under continuous development. Erex has been developed to handle laws and regulations of the various countries in a correct and efficient manner, and to handle any new ways in which the countries use the system. The system is based on a time series model, which is robust and can solve complex requirements. Time series make it easy to build new solutions and adapt existing ones. The basis of the design, development and operation of Erex is that all normal requirements must be handled, as well as new, flexible settlement rules.

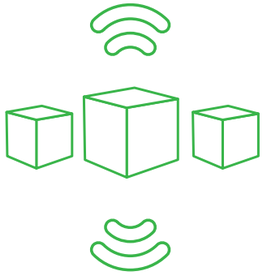


"When we are talking about enormous amounts of data, capacity is critical"

Bart van der Spiegel, Infrabel

Capacity:
Unlimited data handling

Capacity is a critical factor in any data system that must handle large flows of data and large amounts of data processing. Erex has been configured with a virtual platform with almost unlimited capacity. All data processing has been optimised, the associated storage of intermediate calculations has been minimised and efficient process management ensures good capacity utilisation. In combination with a defined regime of contracts, processes and platforms, Erex can handle any amount of data that the defined market supplies to the system.



"When information is shared by many people, we need a system that speaks a language that everyone understands"

Ove Nesvik, Edisys

Interfacing:
Broad data exchange

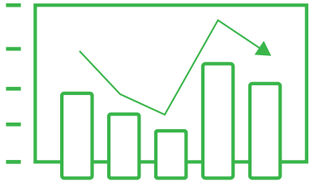
With train operators increasingly operating across national borders, information on energy consumption must often be sent to several different parties. Erex has been developed to exchange data between infrastructure owners and various acquisition systems, and between infrastructure owners and various train operators. Data exchange takes place primarily through UTILTS (Utility Time Series message). This format is based on the EDIFACT standard, and has been specified in UIC leaflet 930 as the format for the exchange of data. Erex can use UTILTS for the entire primary data path. Erex receives and validates all the values from the surrounding suppliers. If the structure of the notification does not comply with the standard, it will be rejected with a message stating the reason. The system supports resending time series with energy consumption, and it also supports downloading received or sent files for manual reading.

"With Erex I have access to information, wherever I might be"

Mattias Jans, Infrabel

Availability:
Strong cross-browser support

A settlement system must be available to all the users, all the time. Erex is optimised for newer versions of any known browser. It requires no local adaption or installation. Erex has been developed using GWT (Google Web Toolkit) for optimal functionality in all the newer versions of Internet Explorer, Google Chrome, Safari and Firefox. Since it is open source, GWT provides access to a number of existing libraries that resolve issues with other, more specialised browsers through comparing response time. Its design ensures that Erex is experienced as browser independent as possible.



"It is amazing that such an advanced system can be so easy to use"

Åge Pedersen, Flytoget, the Airport Express Train

Visualisation:
Simple user interface

Human interaction with a data system (HMI) is crucial to how the quality and value of the service is perceived. Erex has a web interface, with a simple interface for general functions, and a more advanced interface for important functions. The systems' mapping technology for visualisation, adjustment and validation of map references makes it easy to adjust non-conformant measurement data that would have to be rejected otherwise. This increases the utilisation of the received measurement data and the accuracy of the settlement.

"We can easily check that the processes are running as planned"

Gunn-Helene Krogstad, Eress

Process monitoring:
Extensive surveillance

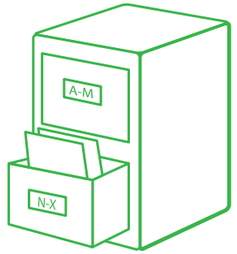
Correct settlement is dependent on a number of processes running at the correct time. In Erex this is ensured by means of a comprehensive process monitoring system: a process log shows all the settlements in the system, a notification log shows all the notification exchanges executed in the system, and a queue log shows all the pending jobs. In addition, the system continuously writes an application log that provides detailed information on situations that the system does not know how to handle. This log function has been implemented with as few technical dependencies as possible, so that it will function even if everything else fails. The application log is monitored by Nagios to ensure that information on any errors reaches the user. Nagios is a third-party tool for monitoring systems and has become an industry standard in operating environments in recent years.

"The system is intelligent. In other words, it just becomes more and more reliable"

Mikael Granberg, Trafikverket

Quality assurance:
Better control

The value of the measurement data is dependent on reliable quality assurance. Erex provides intelligent analysis and validation of the measurement data, manual controls have been standardised and automated, and the analysis of empirical data forms the basis for continuous improvement. The quality assurance is twofold: first-line validation of all the trains that operate internationally and second-line validation within each settlement area. There is a validation function in the process engine that is configurable with various validation rules (missing quality flags, invalid distance, invalid weight, etc.). In turn, each rule is configured with its level of severity and category. Each time a validation rule is triggered the data is flagged, and the user receives a notification. Serious errors will stop the processing of data, while minor errors will reduce the quality flag for the data. If the user enters a manual correction, it will be stored separately, and, when the procedure is run again, use of the correction will be considered, and it may be validated itself.



"With Erex we can recreate any invoice, or the basis for an invoice, at the press of a button"

Carsten G Christiansen , Banedanmark

History:
Easy reconstruction

There is always a risk of error or misuse in any settlement system. If confidence in the individual calculation has been weakened, then confidence in the system will be weakened. By maintaining all the history, any error or misuse can easily be identified and corrected. No data is deleted in Erex; all the data components that are included in a settlement can be found in one place. This means that the user can extract basis data without having to deal with multiple systems or file types. All users in the system – operators, train companies or infrastructure owners – can log in to the system at any time and extract invoices and basis data in accordance with their access rights.

"We need a system that is there when we need it. Minimising downtime is absolutely essential"

Virgin Trains

Delivery reliability: 99% uptime

The railway sector works round the clock, and delivery reliability requirements are high. Erex service providers are certified for the server systems and databases that Erex runs on. They are contractually bound to have certified personell available for the system. The database is monitored continuously, and the service provider is obligated to scale the database, server and processor space for optimal functionality. Erex guarantees a minimum uptime of 99%. This is ensured through a strict test regime that encompasses automatic tests, unit tests, integration tests, regression tests and manual function tests. New developments that are implemented in the system are always tested and verified by at least two people.

"Through the information found in the raw data, we can quickly see where we should focus our energy efficiency efforts"

Margrethe Sagevik, NSB

Access to information: Efficient data extraction

Raw data from energy measurements provides valuable detailed knowledge of energy consumption and can establish a basis for energy-saving measures. Erex customises the extraction modules that communicate directly with the users' analysis or energy collection systems. In accordance with UIC leaflet 930, raw data shall be available within 24 hours after it has been sent from the meter. The measured energy values, reported energy values, reported gross tonnes/km, reported distances, reported tonnes/kilo, etc. can be extracted by means of the automated export of manually defined standard reports, Excel reports on special-format files or web services. Users can log in to the system from any PC with a web browser, and the raw data can be illustrated in the user interface as clear tables and drawings on maps.

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FLEXIBILITY: Customised settlement

CAPACITY: Unlimited data handling

INTERFACING: Broad data exchange

AVAILABILITY: Strong cross-browser support

VISUALISATION: Simple user interface

PROCESS MONITORING: Extensive surveillance

QUALITY ASSURANCE: Better control

HISTORY: Easy reconstruction

DELIVERY RELIABILITY: 99% uptime

ACCESS TO INFORMATION: Efficient data extraction

Utgitt av Eress, mai 2012. Design: Redink. Illustrasjon: Margaretha Andreassen

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