ABSTRACT
This DRAFT white paper considers the role of summary maps at part of a dashboard to insight in the essence of large spatio-temporal data collections.

Author Keywords
Summary maps; dashboard; big data; interface.

INTRODUCTION
Cartographers have always faced grand challenges, and this it not likely to change. In the past they were expected to design and create authoritative maps based on scarce data. This started in the age of exploration and continued until only a few decades ago. With there skills they were expected, despite the lack of data to fill gaps and present a complete image of part of our earth or a specific theme. Special design techniques were use to present trustworthiness and completeness on the map. Even up to today some aeronautical chart hold text like ‘altitude believed not to exceed 20.000 feet’. Today, the data problem remains, however it turned from a deficit to an tremendous surplus. The task of the cartographer remains: design and create maps that are authoritative and offer insight and support decision making. Instead of filling gaps to present the essence of the message, the essence has to be retrieved and presented interactively in multiple alternatives allowing the user to interacted and change, and ultimately understand.

BIG DATA
Lets have a closer look at this big data problem. It is often characterized by a series of V’s: Volume (large data collection; what is large is defined by context); Variety (heterogeneous nature of the data); Variability (for the GI community this refers to difference spatial and temporal scales as well as multivariate character of attributes); Velocity (the update cycle, the generation of new data, the availability of data from ‘unintentionally collected data, crowd sourced data); and Veracity (the data quality, being more diverse then ever).

In the above big data context, the problem seems to be how to retrieve the essence from large heterogeneous spatio-temporal data. The question arises if this is rather a geocomputational / data mining problem or a cartographic problem? Traditionally cartographers are able to retrieve and communicating the essence from data, both in topographic mapping (eg. generalization) and thematic mapping (eg. data classification for choropleth maps). However, these ‘relatively’ simple cases have expanded dramatically. Developments in GI have introduce new techniques beyond cartography, such data clustering to retrieve the essence and to see patterns in space and time. Today interactivity is the norm, and multiple visualization strategies have been proposed, off which Shniederman’s information seeking mantra ‘Overview first, zoom/filter, and details’ [4] is most well known. It has been adapted by Keim [3] to fit the age of (geo)visual analytics, because of the data volumes, today’s application of Shneiderman’s overview could result in cluttered view.

DASHBOARD
A selective (analytical) overview or summary seems the solution. This visual summary should provide a understandable, insightful characterization of the data. How should such summary look like? Since it is unlikely that only a single ‘correct’ summary exists the it might consist of a set of linked maps and diagrams. This calls for the dashboard. A dashboard is to offer most essential information at a glance. Few [2] defines it as: “A dashboard is a visual display of the most important information needed to achieve one or more objectives, consolidated and arranged on a single screen so the information can be monitored at a glance.” This approach is familiar to Bertin’s map to see [1], but now with multiple views. He also states, in line with Shneiderman and Keim that it should show the big picture (the overview) or even summary of the overview, and argues one needs focus on the important and allow for access to the details. As such the summary maps can be considered an interface to the big data. The dashboard to give access to a multitude of functions to allow a wide selections of tasks to be executed. It required a proper design of both the dashboard interface as ell as the summary graphics.

SUMMARY MAPS
The dashboard should give a visual summary of the data’s vital statistics. This includes the data’s spatial extent, the range and variability of the attribute and time interval, as well as information about the (geographic) context. Maps are certainly part of this collection of well designed summary graphics. The questions is which map...
representation(s) would qualify? It is obvious that the nature of the data at hand and questions one has in mind to answer have a decisive role. Cartographic theory does offer some (traditional) guidelines. However, schematic maps might be a prime candidate since they can emphasize or even caricature aspects of the data best. They combine the cartographer’s skill to generalize and classify the data. Choremes could be an example, but might have the disadvantage of not being linked to the user’s world view, because their schematics are already a kind of summary of ‘ordinary’ maps. Beside a main map providing the overview separate but linked maps with information on errors and completeness, data age, etc are needed. The look of the map is guided by cartographic design guidelines to be understanding on the phenomena visualized.

CONCLUSION
It is obvious that this is just a very first idea of what schematic summary graphics can do as interface to big data. The true problem might not be in the design of the summary graphics itself – here we do have a wealth of experience, but much more but how to get the data – the essence - to to be able to create them.

REFERENCES