

BIG DATA

BIG DATA – an exciting power experiment proposal

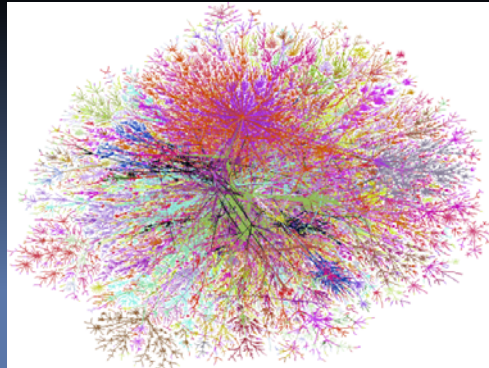
SIEEE Israel - October 2013

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The opportunity

- "Big data" is a rapidly developing Information Technology field.
- Significant power quality and smart distribution opportunities!



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What is “Big Data”?

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- Large (petabyte range) sources of raw data
- Typical sources of big data:
 - economic transactions (for example, credit cards)
 - insurance transactions (for example, Medicare claims)
 - radio telescope receptions (for example, the search for extraterrestrial intelligence)
- Much research on methods for analyzing huge databases
 - Detecting strange events (credit card fraud, medical procedure outcomes, potential extraterrestrial signals, etc.)
 - Human-friendly information about almost incomprehensible masses of data.

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Big Data in electric power

- Data available from smart meters and power system sensors could fall into the “big data” category.
- Example: 100,000 Power quality monitors; 256 measurements per cycle; 6 channels =
60 petabytes of data per year.
- Right in the sweet spot of many Big Data systems!



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How much data flow per instrument?

- About 50 gigabytes per month (2 movies per day)
- Uncompressed raw GPS-stamped data...
- Compression? Probably not.

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Traditional approach to Power Quality

- Develop PQ solutions to improve customer service.
- Power Quality standards.
- Design PQ monitors.
- PQ experts developed specific skills in analysing power system and customers' processes, sequence of events, wave forms and data analysis.

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New challenges!

- Better understand and control the impact of smart grid technologies such as:
 - Distributed Energy Resources and/or Micro-grids
 - Electrical vehicles
 - Advanced power system applications such as volt and var controls
 - "self-healing" grid

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Proposed Big Data Experiment ⁽¹⁾

- Let's set up an experimental prototype "big data" power information system.
- Use GPS-synchronized instruments along a single well-documented distribution lines
- Lines that have both diverse loads and dispersed generation and storage.
- Opportunity! This experiment could be a low-cost extension of Israeli mirror of ARPA-E project on micro-synchrophasors.



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Proposed Big Data Experiment (2)

- We propose to make the raw data completely public on the model of:
 - <http://map.PQube.com>
 - Human Genome project
 - Gutenberg project
- Worldwide researchers and students will be able to test, demonstrate, and publish surprising new algorithms for understanding power quality and power flow, at almost zero cost.



Call to action: Interested?



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