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Network Engineering Industry in World Economy

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About Network Engineering Industry

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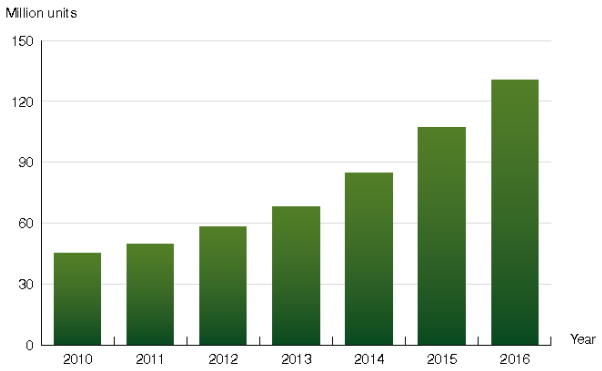
- **Network centric Industries:** Assets / Inventory spread across a wide geography as a complex network
- **Prime Examples:** Fixed line & wireless telecom operators, gas & electric utilities, street networks.
- **Key Technical / Operational Challenges:** Aging infrastructure, Severe weather conditions, Managing massive amounts of data, Lack of standardization and interoperability.
- **Regulatory Challenges:** Legal, Environmental, Commercial
- **Commercial Challenges:** Efficient Resource Planning in a spatially distributed environment, Customer experience & retention, Geographical penetration, Average Revenue per Unit, Profitability under cost pressures and regulated environment.
- **Solution:** Efficient planning, design, operations, management and maintenance of networks – **Geospatial Technologies play a crucial role here**

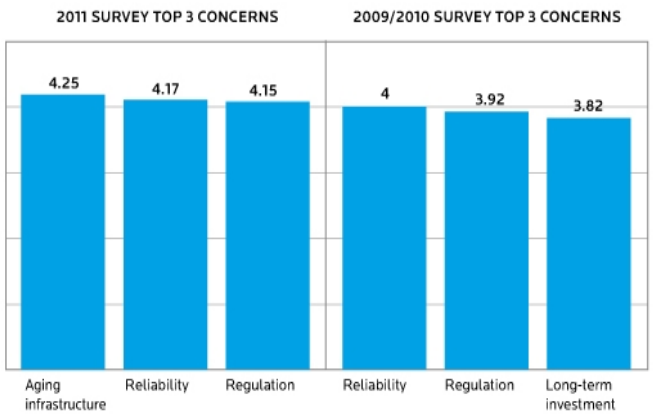
Industry Perspective - Electric Utility Industry

Key Trends

- **Smart Grid Initiatives –** Smart Meters, Green Initiatives, Efficiency, Rechargeable grid, Variable tariffs. Billions of $ to being invested
- **Smart Metering -** About 60mn units installed so far in Europe. About 100 million additional meters planned to be installed by 2016
- **Energy Efficiency** – 8% progress between 1997 – 2007. Target to reduce consumption by 20% by 2020
- **Green Energy** - EU Has 20/20/20 Green Vision for delivering clean, efficient, competitive and sustainable energy by 2020
  - Renewable Energy – Goal is to reach 20% from the current 10% level
  - Greenhouse gas emissions – Target towards cutting it down by 20%



Installed base of electricity smart meters (EU23+2 2010–2016)



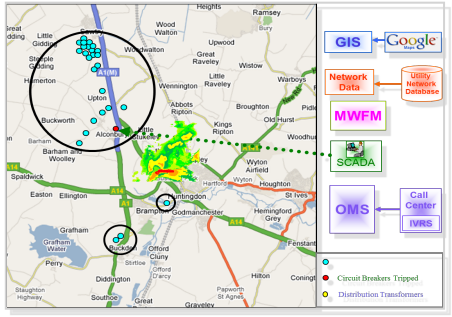
Source: Black & Veatch

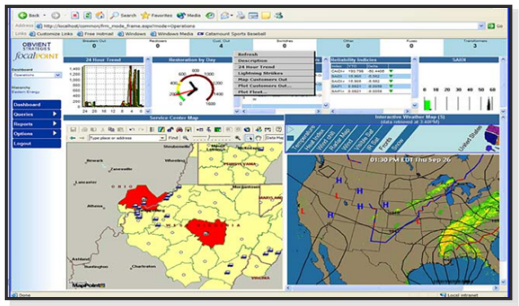
Challenges:

- **Ageing Infrastructure** – Leading to supply reliability issues
- **Severe weather conditions** - Triggering outages
- **Smart Grid Implementations** – Generating Tsunami of data which needs proper management
- **Lack of Standardization** – Interoperability challenges among Utility systems
- **Regulatory Pressures** – Dent on profitability

Role of Geospatial Technologies - Utilities

- **Spatial visualization of Network Assets / Inventory**
  - The complete network is visualized as in real world. Critical for planning, design, operations and maintenance
- **Geospatial information is foundational for realizing Smart Grid**
  - Need spatially enabled data that is up-to-date, positionally accurate, complete, connected & consistent
- **Potential to unify Utility systems in handling the massive amounts of data generated**
  - Meter information alone is going to multiply about 3000 times
  - Traditional means of viewing information will not suffice
- **Supports Outage Management as situational awareness offers inclusiveness of data**
  - Weather and other issues may cause disruptions. Helps in restoration efforts, handling emergency response and crew deployment/ management
- **Operational Optimization under regulatory pressures**
  - Improving duration & frequency of interruptions by optimally maintaining assets
- **Geospatial dashboards – data analytics and BI**
  - Technical and commercial loss detection, varying tariff to optimally manage demand & supply, market and consumer information





Industry Perspective - Telecoms

Key Trends

- **Key contributor in Digital economy –** Impact on GDP and Economy. Tele-density is an important economic indicator
- **High speed Broadband -** A recent study quantifies the isolated impact of broadband speed, showing that doubling the broadband speed for an economy in the OECD region increases GDP by 0.3%
- **Disruptive technologies** - Are bringing in huge convergence in the areas of voice, data, and devices. An FTTH connection can deliver all
- **New Consumer demands** – Productivity improvement, Social media, Entertainment, Gaming. Over 30% of the global population is now connected to Internet. Over 6 Billion mobile subscribers

Challenges

- **Massive Investments needed** – Trillions needed for new roll outs like LTE / 4G to meet ever growing customer aspirations/ demands.
- **Creation of new networks -** Need to create the network where demand and cash exist. Both are dynamic in nature.
- **Profitable growth** – New networks may not necessarily translated in healthy growth. Value Added Services the key to profitable growth
- **Customer acquisition retention** – Highly competitive, interoperable, customer experience is the key
- **High operational efficiency** - A four dimensional problem – Location of Users, 24X7, Capacity required, Quality of Service and experience

Role of Geospatial Technologies - Telecoms

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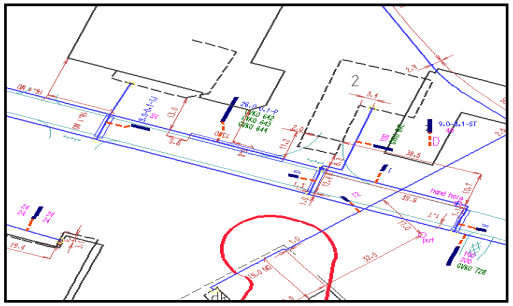
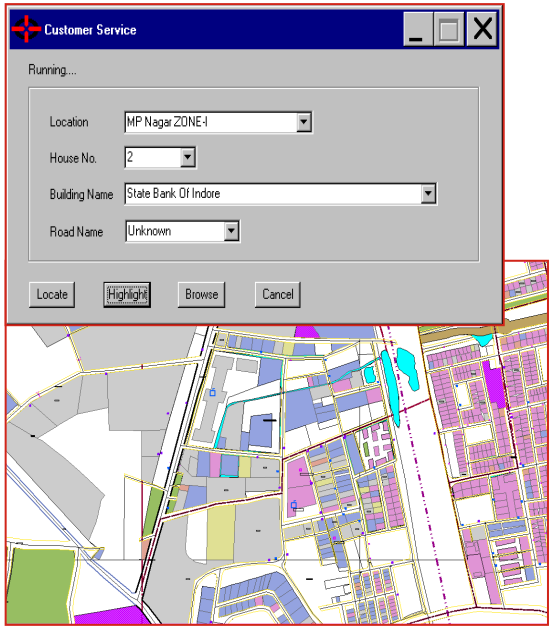
- **Spatial dimension enhances the Network Planning process**
  - The complete network is visualized as in real world. Critical for planning, design, creating new networks, and upgrading existing infrastructure
- **Facilitates efficient Network Management**
  - Helps managing the network and understanding the capacity requirements against the network demands. Supports capacity augmentation process
- **Multi – dimensional visualization of the network**
  - Geospatial data is now multi-dimensional with sophisticated imagery and 3D Maps. Both OSP and ISP data can be viewed along with the connectivity details and tracing facilities
- **Supports service provisioning, assurance and maintenance**
  - Supports Field Force Management, restoration of services caused by disruptions, emergency response and crew deployment.
- **Operational efficiency through improved Asset Management**
  - GIS is the only tool that enables Operators the ability to View, Plan and Manage the ever expanding networks and its assets.
- **Business Planning, data analytics and BI**
  - Offers Business Intelligence and market information in geographical context which is useful considering the wide coverage of the networks

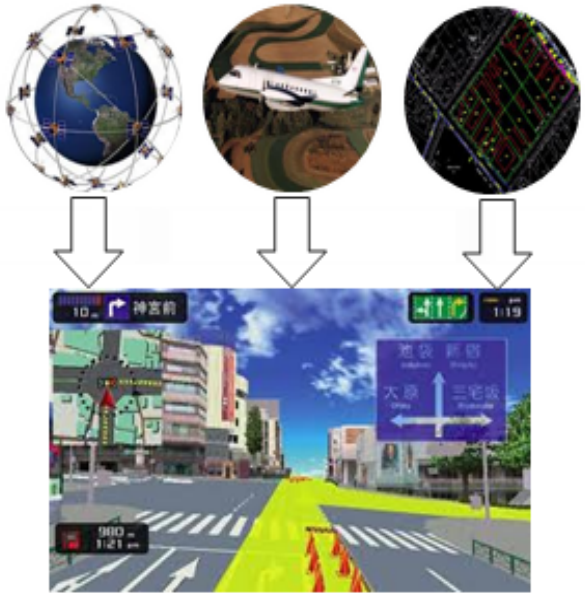




Industry Perspective - Street Networks

Key Trends

- **Advent of Intelligent Vehicles –** Unmanned vehicles
  - Fuel Efficiency (ADAS) - Advanced Driver Assistance Systems
  - Road Safety (Improved Driver Decision Making)
- **Flying Cars / Roadable aircraft**
- **Green Vehicles -** That are energy efficient or use non conventional environment friendly non fossil fuel
- **Next generation vehicles will need matching streets**
  - Smart streets supporting navigation and energy optimization
  - Overlay information of Traffic, Weather, POI etc.
- **3 D Visualization, models, design and Intelligent RIS**
- **Crowdsourcing**



Challenges:

- **High cost of data creation, maintenance –** Street data is created at a high cost using surface, aerial, satellite sensors
- **Need highly accurate data for precision in navigation**
- **Continuous updates to keep the data navigable –** Street information is continuously changing
- **Integration:** With systems / data like Traffic, Weather, Emergency Response etc.

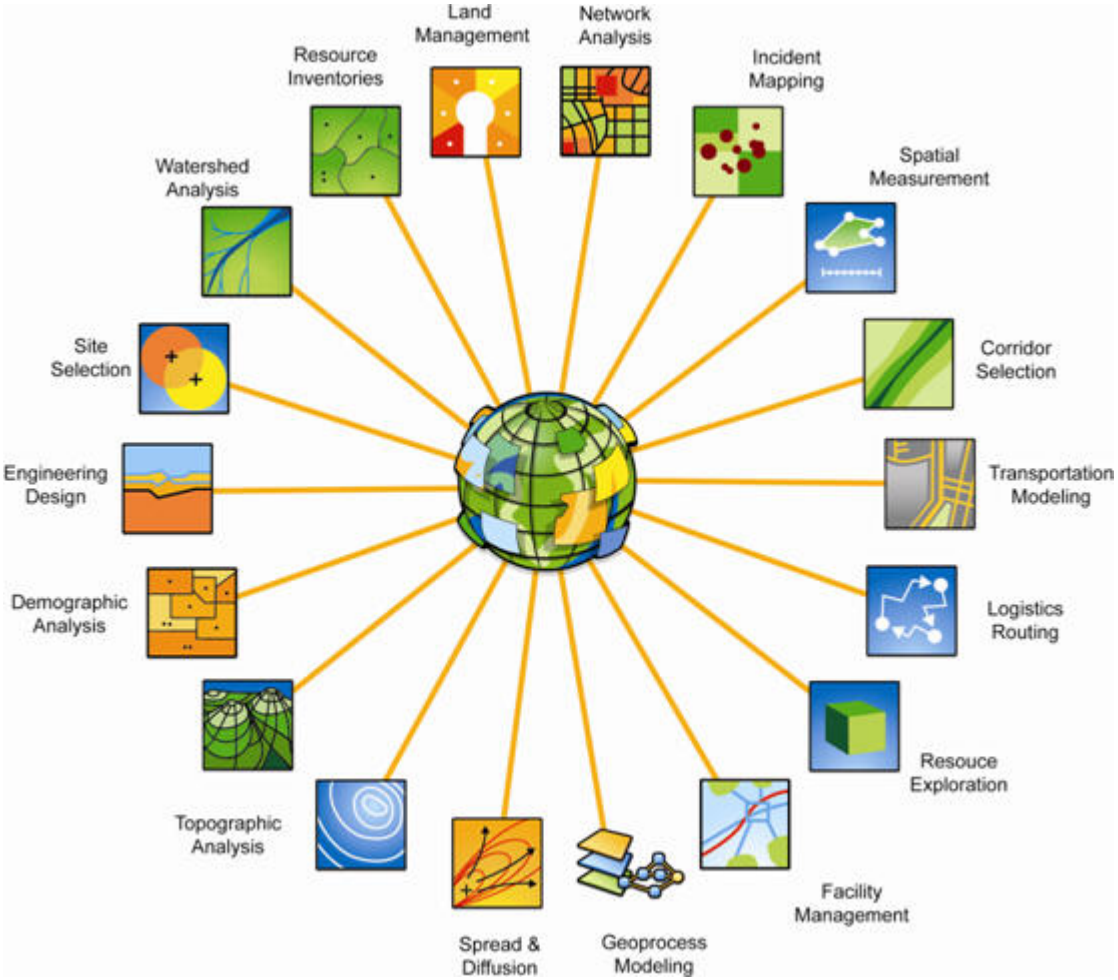
Role of Geospatial Technologies – Street Networks

- **3D Design, modeling, visualization**
  - The complete network is visualized as in real world. Supports planning, design, operations, maintenance and locational intelligence
- **Route / ROW information – Planning & Operations**
  - Supports routing and provides ROW information – essential for planning and construction of new road networks
- **Maintenance of Streets and Asset**
  - Visual and attribute information facilitates easy maintenance of the network as well as the Assets alongside
- **Efficient trip Planning**
  - Traffic / Weather information, shortest route, fastest route, points of interest, e-commerce
- **Turn by Turn Navigation**
  - Turn by turn navigation for vehicles, manned or unmanned. Complete route assistance with time and distance information to destination
- **Driving / Traffic assistance, Safety**
  - Supports safety solutions like anti-collision, speed / curvature / slope / other hazzard information and warning, traffic density information, emergency response

Conclusion

GIS as Foundation for Future Systems:

- Unifier of systems in a Smart Grid
- Effective tool in handling big data
- 3D visualization and virtualization
- Enabler for roll out of NGN
- Advanced navigational experience and locational intelligence



This picture needs to be redesigned

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Thank You

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