Machina Research

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Internet of Things Conference
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Where is the value in IoT? IoT data and analytics may have an answer

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About Machina Research

- **Machina Research is the world's leading provider of market intelligence and strategic insight on the rapidly emerging Machine-to-Machine (M2M), Internet of Things and Big Data opportunities.**

- **We provide market intelligence and strategic insight to help our clients maximise opportunities from these rapidly emerging markets. If your company is a mobile network operator, device vendor, infrastructure vendor, service provider or potential end user in the M2M, IoT, or Big Data space, we can help.**

- **We work in two ways:**
  - Our **Advisory Service** consists of a set of Research Streams covering all aspects of M2M and IoT. Subscriptions to these multi-client services comprise Reports, Research Notes, Forecasts, Strategy Briefings and Analyst Enquiry.
  - Our **Custom Research and Consulting** team is available to meet your specific research requirements. This might include business case analysis, go-to-market strategies, sales support or marketing/white papers.

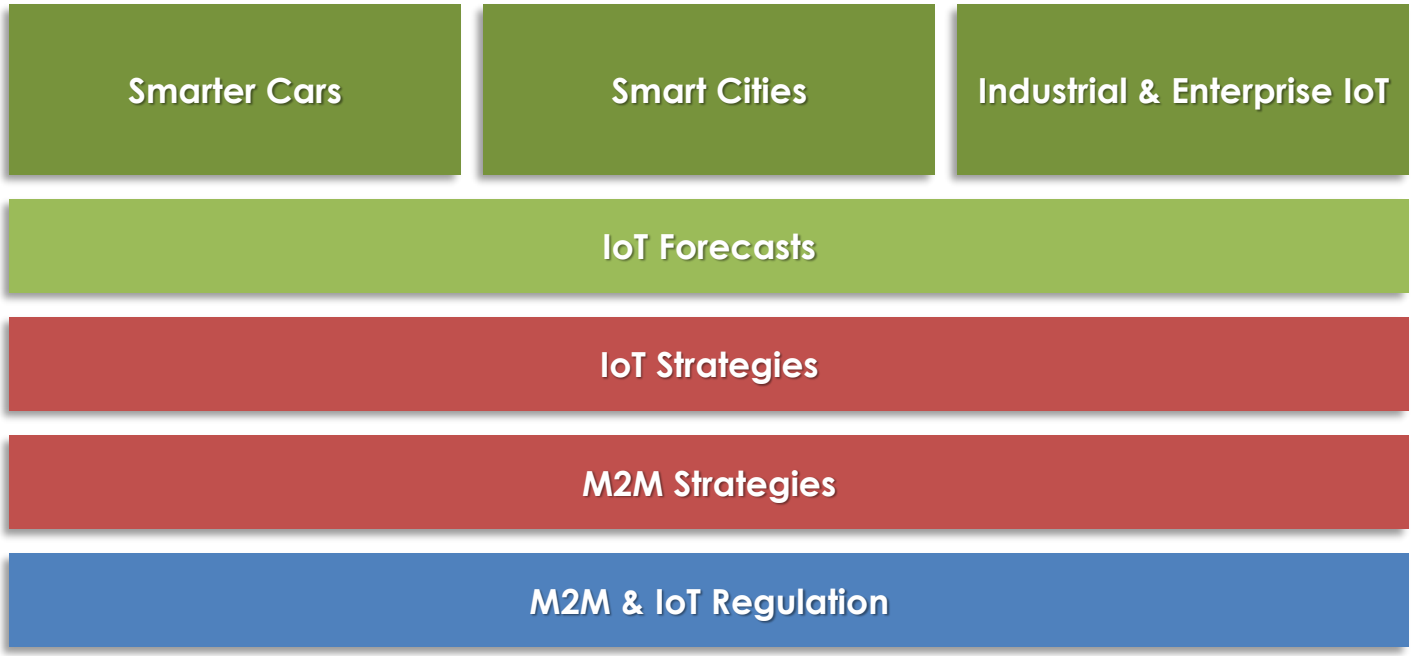
- **The company was founded in 2011 by Matt Hatton and Jim Morrish, two experienced industry analysts and the team has grown substantially since then.**

Some of our clients

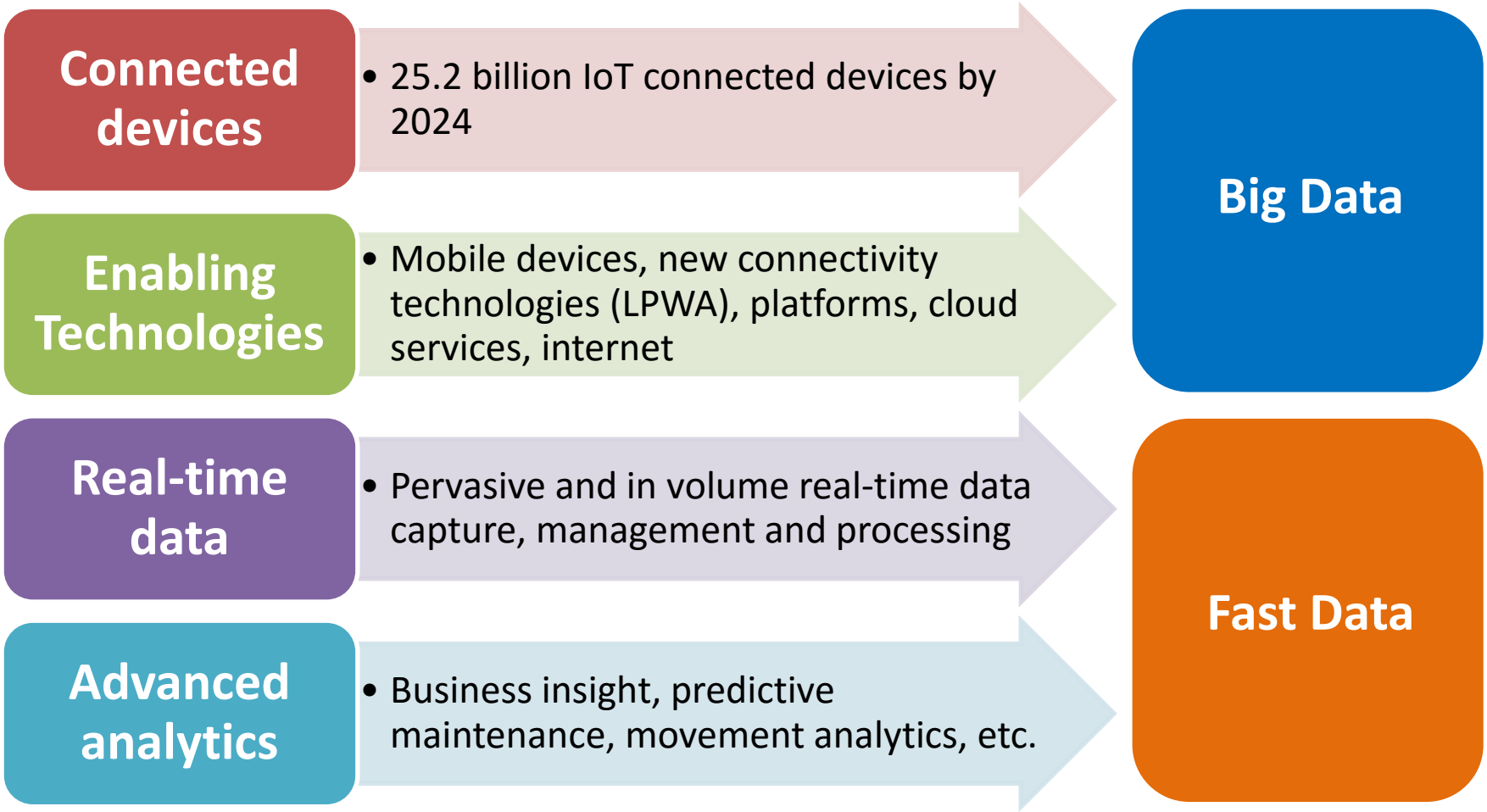
Advisory Service Research Streams

The Machina Research Advisory Service Comprises 7 Research Streams

- M2M Strategies and IoT Strategies pull together our horizontal expertise, supported by M2M & IoT Regulation
- Forecasts and application analysis for our five 'Connected' verticals (Cars, Cities, Health, Industry and Living & Working) consolidated in the IoT Forecast Research Stream
- Smarter Cars, Smart Cities and Industrial & Enterprise IoT Research Streams delve deep into addressing the requirements, opportunities and challenges of car manufacturers, city managers and enterprises as they deploy IoT



Four IoT technology vectors are transforming markets and behaviours



Source: Machina Research, 2016

Two new themes in data development and management – big and fast data

- Data produced in ever increasing amounts to terabytes to petabytes
- Structure of the captured data has evolved include semi-structured and unstructured
- Aggregation and processing of data has le multiplication of repeated data sets

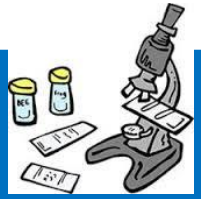
Big Data

- Advancements in ingestion and processing accelerated the velocity of data
- Processing speeds from days and hours to and milliseconds
- Combination of batch and in-stream proce completely new analytics' outcomes

Fast Data

Source: Machina Research, 2016

Examples from the real world of these dramatic changes in big and fast data



Big Data

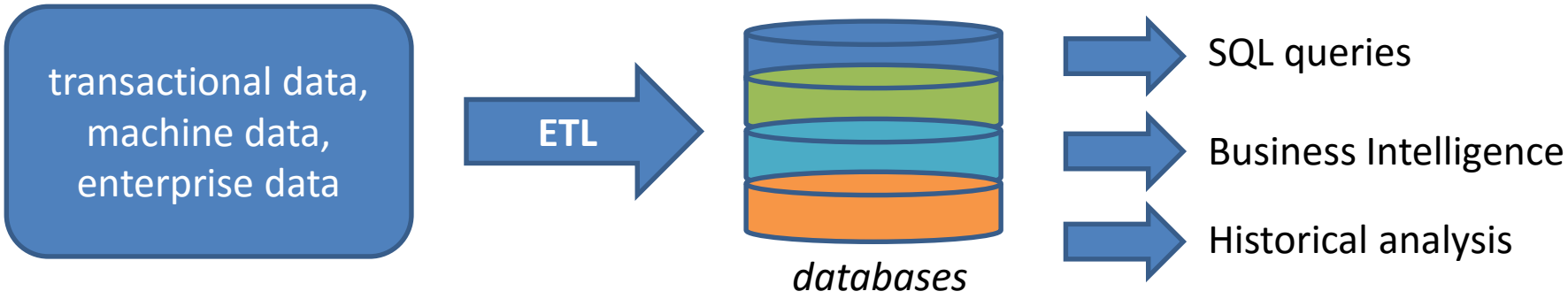
- Boeing 787 wide-body airplane generates about 500GB of flight data in just one flight including such "factors as cabin and tyre pressure recorded alongside engine and component information." (Source: MRO Network, "Dealing with the Big Data surge," April 2016)
- A small slide scanner running 200 slides per day at medium resolution in digital pathology processes will generate over 20TB of data per year. [Nik Stanbridge, What Can Be Done to Better Manage Big Data in Healthcare?, April 2016]
- 50 TB of generated gaming data per day [Revolutions, Big Data and Predictive Analytics in Video Games, March 2013]

Fast Data

- Driven by gaming, IoT solutions have started to leverage the strengths of such new capabilities as **Massive Parallel Processing** in a localised context, delivered by companies like ParStream (acquired by Cisco) and Sqream – these solutions "enable near real-time analytics on massively ingested online data analyzed against years of historical, stored data, in a cost-effective manner." [Sqream website, April 2016]
- Advancements in real-time analysis and instant feedback loops with such analytical tools as machine learning has become a game changer

Source: Machina Research, 2016

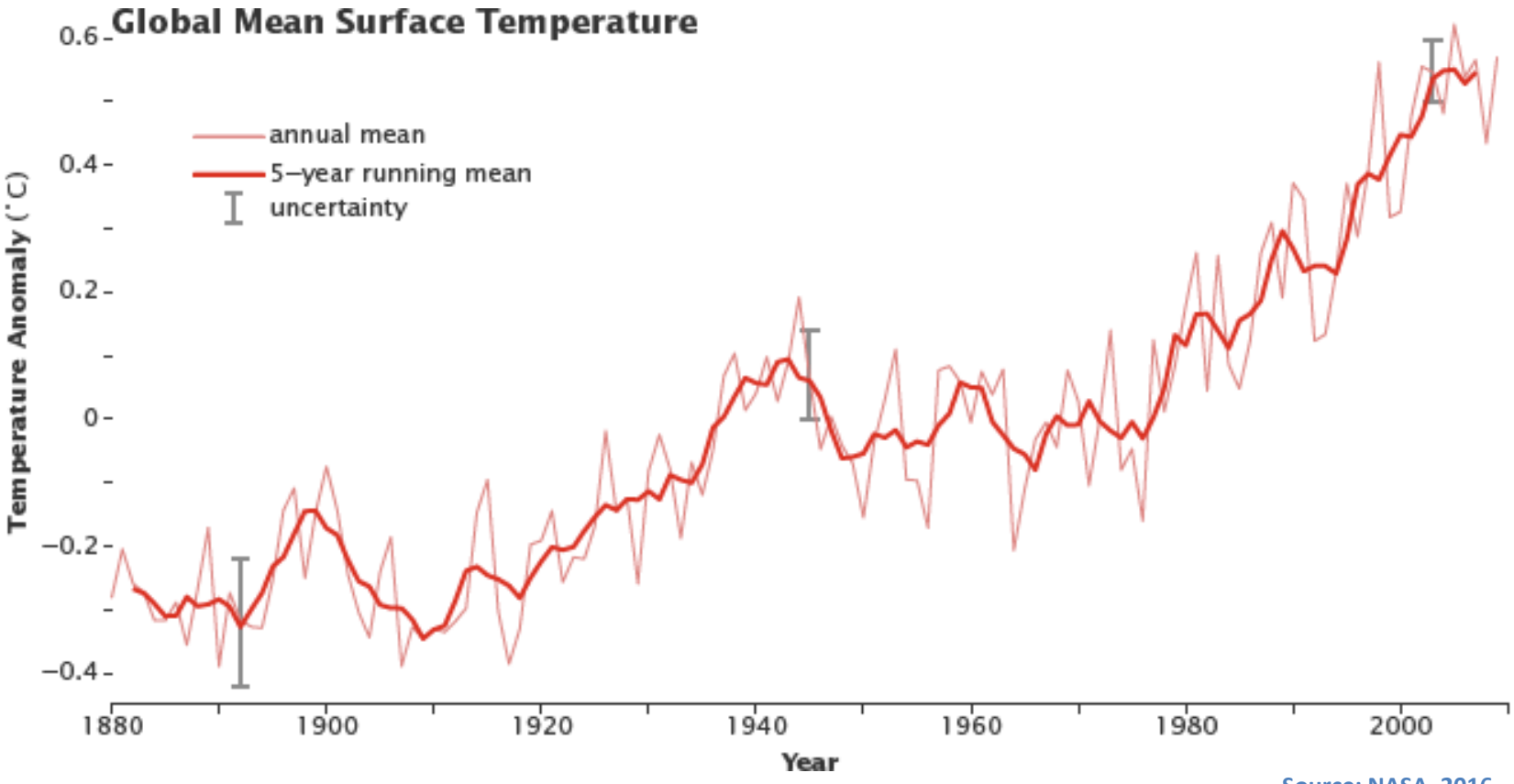
Quick reminder of how data was processed and value created for enterprises



Significant insight and value was achieved from analysing trends and historical performance, and noting areas of improvement.

There were limits. Data storage was expensive. Very expensive.
The data analysed was usually hours, days or weeks old.
Analytic feedback was mainly for strategic and business improvement processes rather than operational processes.
The aggregation of historical data did however allow trend analysis and comparisons to past performance.

Value from trend analysis and historical data depends on the application



Source: NASA, 2016

Without fast data, certain IoT applications and solutions would not be possible

Real-time insights come with fast data, processing real-time data with historical data

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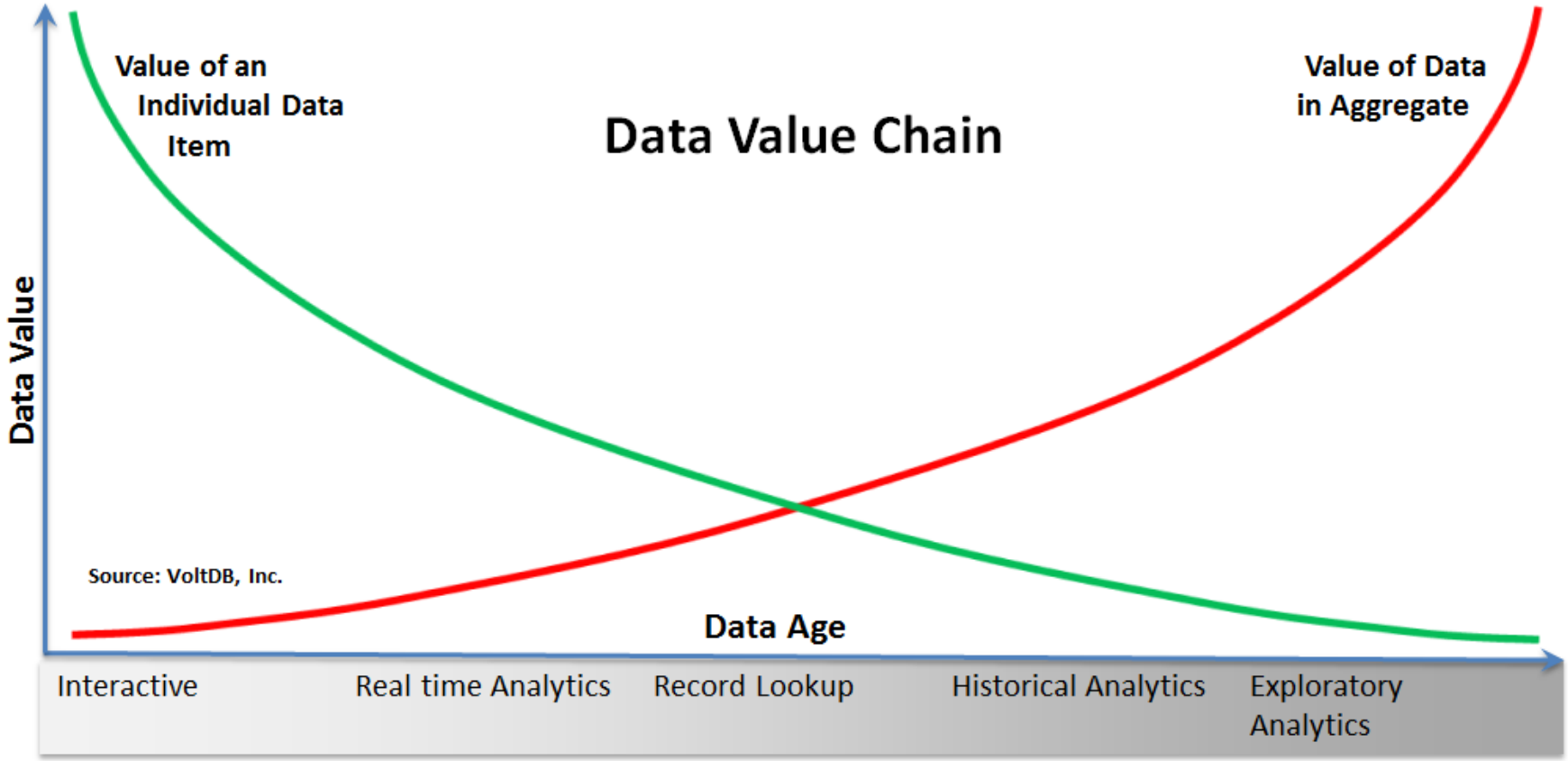
Connected Car	Imagine the limits placed on a self-driving with extreme latencies in terms of new commands and executed commands
Connected Industry	Imagine the challenges of automating industry processing and manufacturing lines where operational decisions are continuously aligning systems
Connected Health	Imagine the healthcare challenges where critical health information was not analysed and processed in real-time

Value data chain by VoltDB explains the relationship between Big and Fast Data



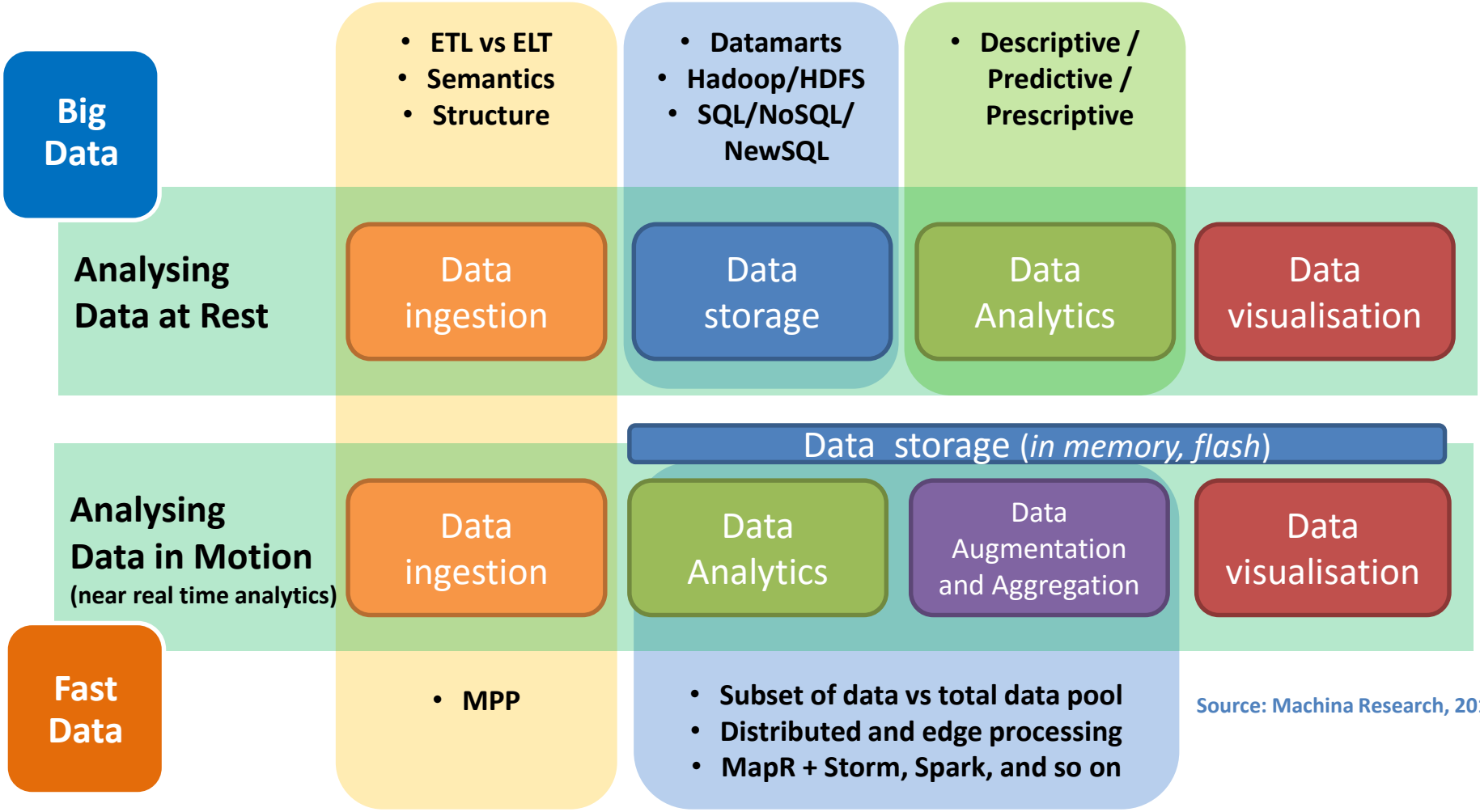
Big and fast data have started to deliver new business models, services and customers

Connected devices	**Real-time information** from connected devices, enabling **condition**, **usage** and **performance monitoring** *New business models such as pay per unit (per HP), behaviour related (UBI), opex-driven, sharper and clearer SLAs*
Enabling Technologies	**Scalability, agility and flexibility –** what new enabling technologies such as cloud, platforms and databases provide are tools to manage big and fast data *Insight through data aggregation, integrated billing in Enterprise IoT*
Real-time data	**Seconds and milliseconds** for data management and processing is becoming a norm, enabling real-time applications and analytics to work hand-in-hand. *Automated processes such as Industry 4.0, time critical applications*
Advanced analytics	**From descriptive and historical analytics** to **predictive and prescriptive analytics -** a shift from analysing past actions to evaluating and executing future courses of action *Augmented intelligence, Artificial Intelligence, Applications + Analytics*

Big and fast data have started to deliver new business models, services and customers

User-based insurance	Driving behaviour Future home insurance schemes (cooker left on, open fires, etc.)
Pay per unit / usage	Per print (traditional copier model), per horsepower (Rolls Royce), per hour (ZipCar, CityCar), electricity generating generators, and so on
Condition based charging	Battery management, marine vessels, containers, charging driven by condition based maintenance
Recommendations	Recommendation engines in Amazon or Netflix to generate revenues from either long-tail products or promotions

Big and fast data have had significant impacts on data management technologies



Source: Machina Research, 2016

Future value in IoT is in the combination of applications and advanced analytics

- IoT data and analytics are **value enablers** – through big and fast data, new business models, services and customer experiences can be created
- **Data** may have some intrinsic value (if monopolised) however with the scope of data acquired and the aggregation of data being another approach, value in IoT moves to the **application** and the **quality of analytics**
- Producing **advanced analytical tools**, i.e. **machine learning capabilities** with greater predictive and prescriptive accuracies will become a crucial competitive differentiator

Thanks

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