DIGITAL MODULATION OF IT

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Abstract

There is a pressing need for enterprises to enhance their Information Technology capability in keeping with the requirements of the new digital world. Sensing and controlling interaction among and between artificial things, natural things and humans will open up a world of value generating opportunities. The paper takes a pragmatic look at the emanating business requirements and identifies the capabilities that IT needs to focus on. The 16 areas identified here will help build a comprehensive capability tuned to the digital world. Considering the broad scope of IT today, a big bang transformation is not feasible. Enterprises will have to clearly identify and prioritize areas relevant to their businesses.

Introduction

The new wave of SMAC technologies offer a powerful form of interaction and collaboration, opening up a host of opportunities for enterprises. The changes are leading to disruptive innovation, reshaping business models, offering a level-playing field to new entrants as well as questioning the existence of others.

According to IDC, what they call the "third platform" (built on a foundation of Cloud, Mobile, Social and Big Data technologies) will account for worldwide spend of $5.3 trillion by 2020[1]. Be it a retail, manufacturing, fashion or transportation industry, the unprecedented convergence of people, business and things is bound to create new business designs.

The capability of an enterprise revolves around its ability to sense, analyze and control the world it is concerned with (see Figure 1). Be it human interactions in a social media, his or her interaction with things

artificial or living, all these are scenarios that can be instrumented and sensed by today's technology.

These can turn highly valuable when a business is able to analyze and translate this to meaningful actions. The actions eventually would

influence and exert required control in favor of the stakeholders. The scenario could be applied to many situations where one deals with pets, farms, plantations, husbandry etc. or non-living things like machines, vehicles, buildings etc.

[1] IDC Vendor Spotlight, Sponsored by SafeNet, Supporting Software Business Transformation with Systems Designed for the Task, November 2014 - http://licensinglive.com/wp-content/uploads/2014/12/Supporting-business-transformation-with-systems-designed-for-the-task_IDC-Spotlight.pdf
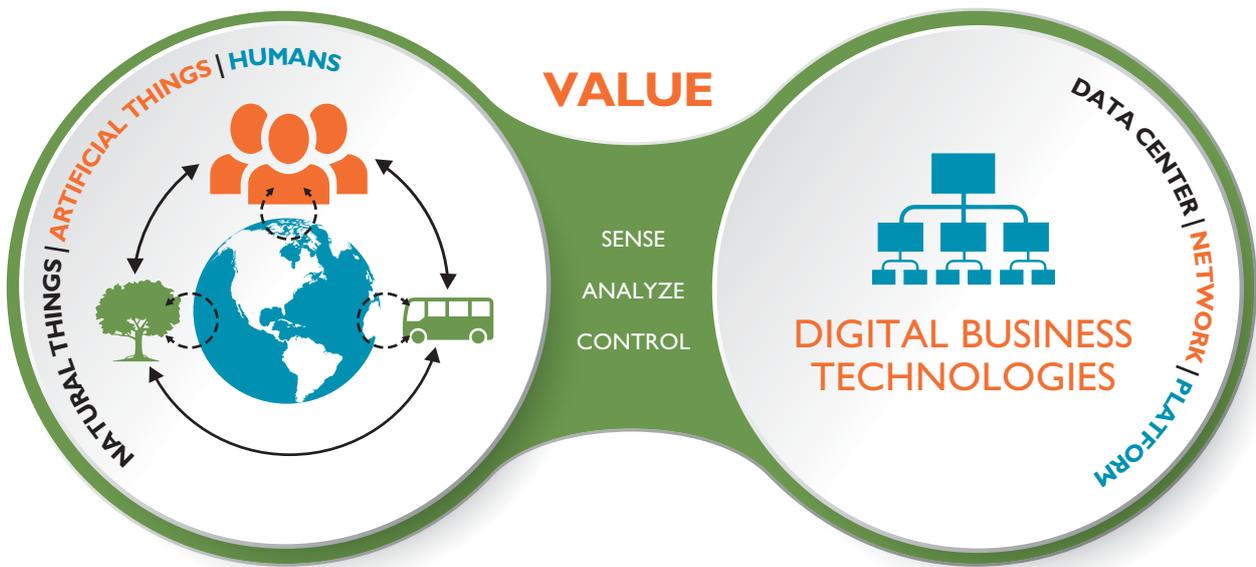

Figure 1: Sensing, Analyzing, Controlling

The Problem

A quick analysis shows that much of what is needed to fulfill the capabilities is complex and also very different from what and how things are done today. The radical shift requires overhaul of many aspects of an enterprise architecture. There is a need for broad-based changes touching upon the business process, information systems and the technology architecture of an enterprise.

Enterprises today are estimating that new digital solutions will consume about 70% of their total IT spend. They also estimate that these new digital solutions will eat into 60-70% of their IT personnel bandwidth. There has been early adoption of Social, Mobile, Analytics, Cloud, Internet of Things (IoT) and the incremental buildup of capability have given many insights.

A comprehensive appreciation of this and the all-round capability requirement will need a thorough analysis of the following areas.

o   Social: Information pertaining to people that an enterprise is concerned with, like social media interactions, geo locations, other publicly available information can have huge potential

o   Mobile: This ubiquitous medium reaches and connects employees, partners and customers. Enabling new functionality and deriving actionable intelligence is a key focus

o   Cloud: Integrating information from Infrastructure-as-a-Service, Platform-as-a-Service, to a whole Software-as-a-Service means a distributed information model with wealth of information to leverage

o   Internet of Things: While the world is expected to have a few billion intelligent devices by 2016, managing the lifecycle and deriving actionable information from every bit of real time data can be a game changer

o   Analytics: The ability for humans to apply science around the data from all the above is eventually going to become the supreme requirement

Solution and Recommendations

The realms of Social, Mobile, Cloud and IoT are dealing with a global scale rather than the confines of an enterprise. The need to sense, analyze and control in the digital world will mean scale will be proportional to the capability and indirectly proportional to the value that can be generated (see Figure 2).

DIGITAL BUSINESS CAPABILITY

SCALE ∝ CAPABILITY ∝ GENERATE VALUE
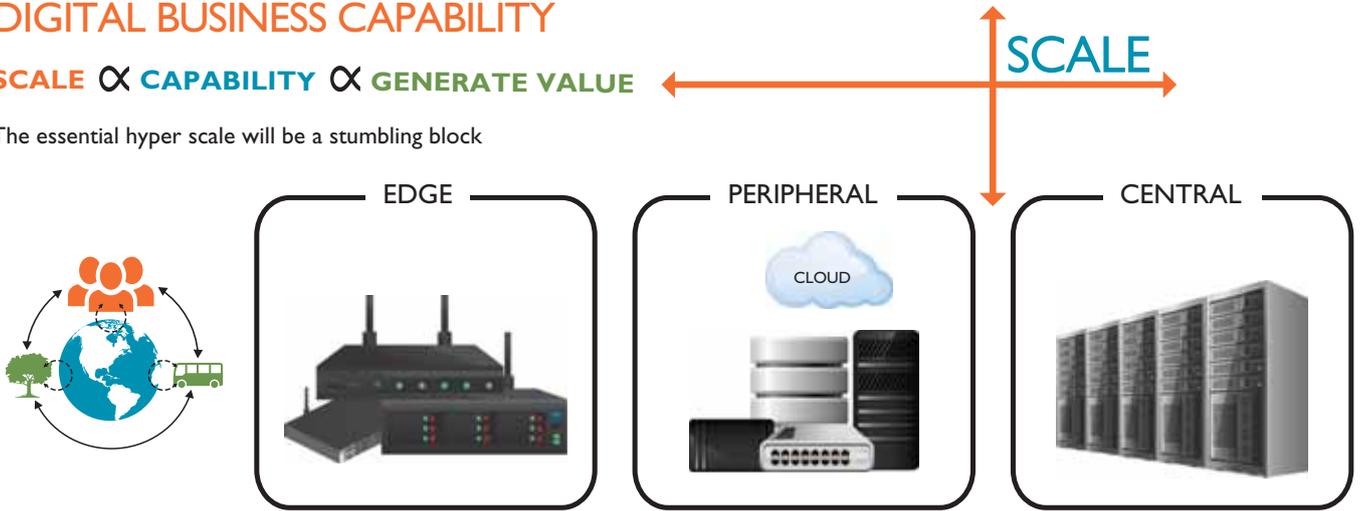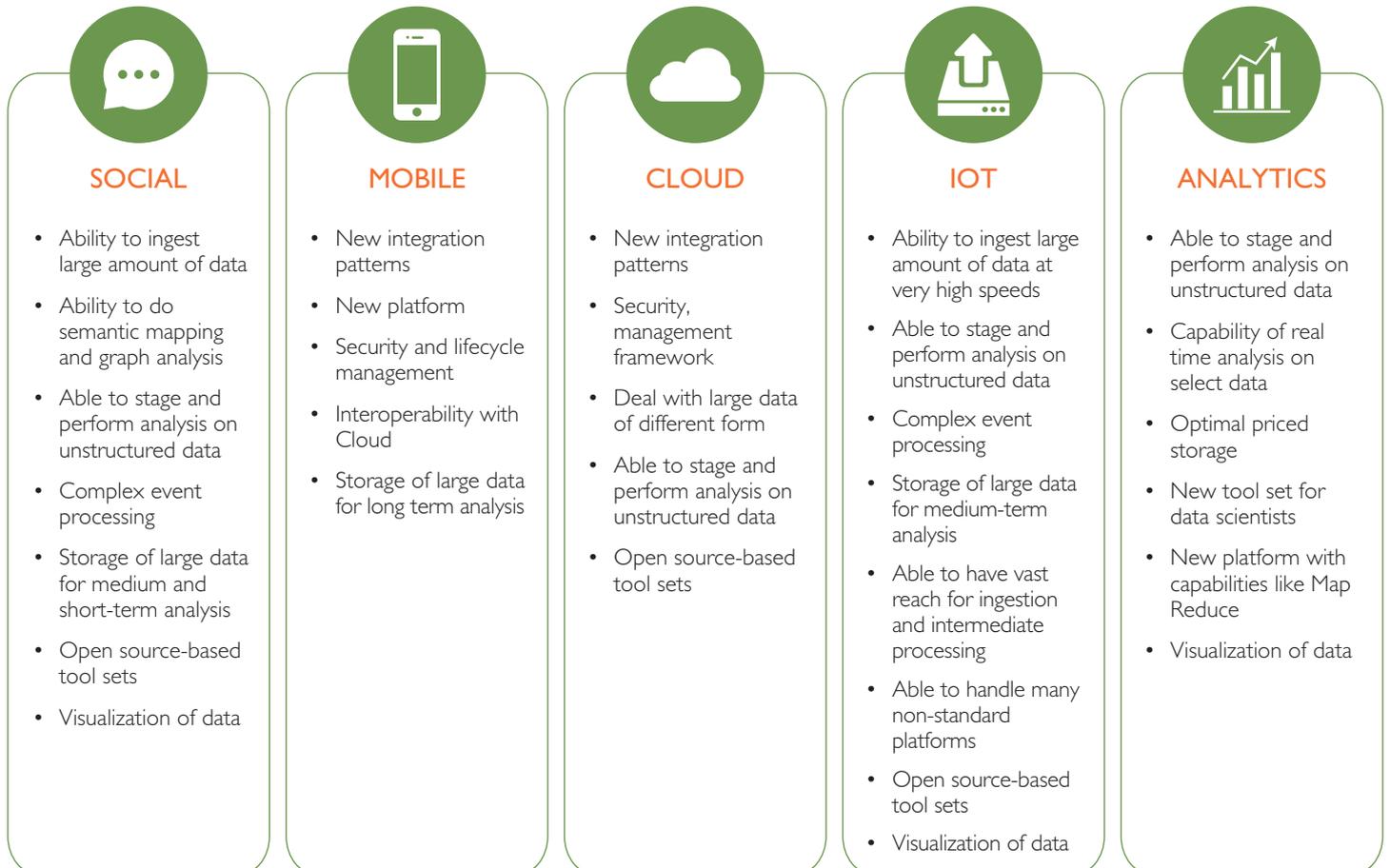
The essential hyper scale will be a stumbling block

Figure 2: Scale versus Capability

The future architecture changes will need a detailed analysis of the requirements.

SOCIAL	MOBILE	CLOUD	IOT	ANALYTICS
• Ability to ingest large amount of data	• New integration patterns	• New integration patterns	• Ability to ingest large amount of data at very high speeds	• Able to stage and perform analysis on unstructured data
• Ability to do semantic mapping and graph analysis	• New platform	• Security, management framework	• Able to stage and perform analysis on unstructured data	• Capability of real time analysis on select data
• Able to stage and perform analysis on unstructured data	• Security and lifecycle management	• Deal with large data of different form	• Complex event processing	• Optimal priced storage
• Complex event processing	• Interoperability with Cloud	• Able to stage and perform analysis on unstructured data	• Storage of large data for medium-term analysis	• New tool set for data scientists
• Storage of large data for medium and short-term analysis	• Storage of large data for long term analysis	• Open source-based tool sets	• Able to have vast reach for ingestion and intermediate processing	• New platform with capabilities like Map Reduce
• Open source-based tool sets			• Able to handle many non-standard platforms	• Visualization of data
• Visualization of data			• Open source-based tool sets	
			• Visualization of data	

There are many areas that the new requirements touches upon, following are the areas from an IT department perspective that an enterprise needs to analyze and prioritize for implementation.

MULTIPLE SERVICE PROVIDERS: The service providers today provide many services that include Data Center, network, maintenance, operations, etc. Service providers have evolved to provide all-encompassing service in an outcome-based model. The services could range from Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS), Software-as-a-Service (SaaS), Network-as-a-Service, Desktop-as-a-Service to further areas like Tools-as-a-Services, Identity Management-as-a-Service, Device-as-service etc. The ecosystem is evolving to not only provide this on a Cloud but also on a dedicated on premise model.

NEW ISVS & OEM: Many IT departments have shied away from small players and stuck to established players, partly due to enterprise architecture compliance and other transactional huddles. A new breed of OEMs & ISVs have emerged with niche offerings and unique value propositions. They could range from specific device manufacturer, specialized platform, new network devices, tools etc.

VARIETY OF ASSETS: The proliferation of IoT and mobility is going to go against current standardization drives and bring in new devices.

LIFECYCLE MANAGEMENT: Lifecycle management of traditional hardware and software is very different from what is required for managing tiny things or wearable devices. The life of these devices, the device cost, the routine maintenances (like changing) are going to pose new challenges that need to be dealt with.

RANGE OF TERRESTRIAL AND NON-TERRESTRIAL NETWORKS: In addition to the network that an organization deals with, there will be need to integrate mobile 3G, LTE/4G and other future networks for carrying enterprise data. There will also be a need to explore low-powered wireless like Zigbee, Bluetooth LE type devices. Trends to adopt 802.11AC is already underway in many organizations. Others networks like CANbus, industrial ethernet are of interest.

NEW PLATFORMS: While the transitional platform and bespoke solutions are not going to disappear soon, there will be need to introduce new platforms better suited to handle the scale and also better adopted for mobility. Areas like Symantec Web, machine learning platforms are going to be of keen interest. Cloud based and other Open Source ecosystems are emerging as a compelling alternative in many cases.

DEV AND TEST TOOLS & PRACTICES: Transitional SDLC processes are seeing few takers for adoption in the new digital age application developments. With strong focus on Cloud, Big Data and custom platforms, agile processes with continuous integration are finding more approval. Need for tools enabling DevOps functions, container-based deployment etc. are becoming essential.

HIGH PERFORMANCE COMPUTE: Traditionally a forte of scientific community, there are specific use cases when such systems find application in new age enterprises. Scenarios where there are applications of High Performance Compute include situations where thousands of connected things are emitting streams of data and there is a need for real time analysis and decisions making.

PARALLEL FILE SYSTEMS: Dealing with Big Data has become a norm for many digital applications. Traditional SAN, NAS, JBODS are getting complemented with software defined storages, Hadoop and other Map Reduce capable systems. Parallel file systems can be niche solution that often go with high performance compute and provide high throughput on vast volumes of data to provide real time access.

EVOLVING NETWORK PLATFORMS & PROTOCOLS: In addition to the well-established ethernet networks, there will be a need to establish network designed for very low energy consumption devices.
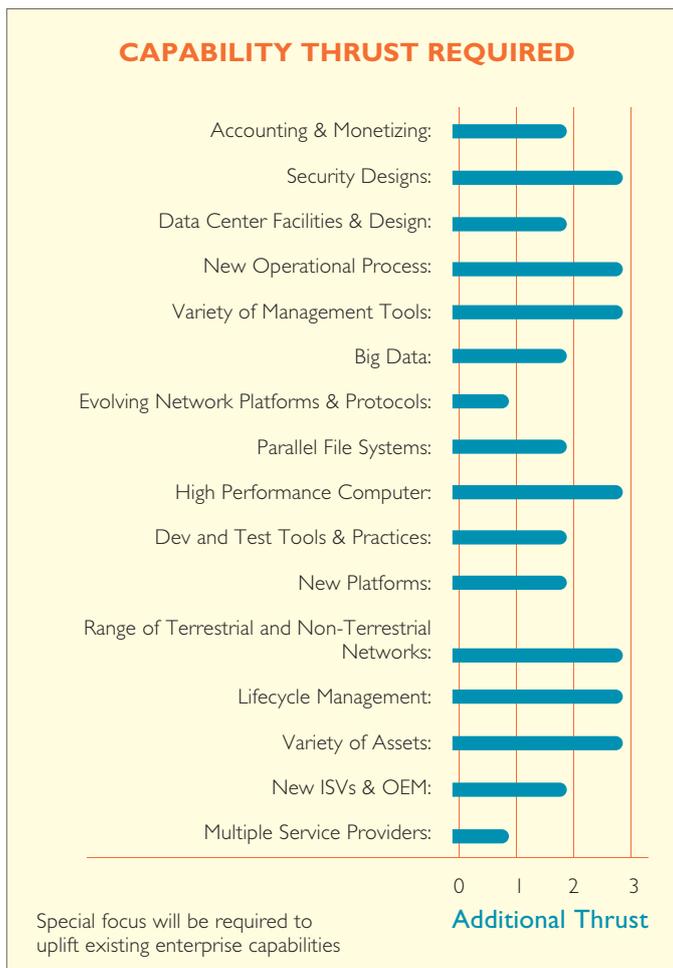

CAPABILITY THRUST REQUIRED

Special focus will be required to uplift existing enterprise capabilities

Additional Thrust

Figure 3: Focus Areas

Zigbee, Bluetooth LE are few examples of these protocols. Software Defined Network is getting lot of attention as replacement for expensive hardware that has limitations in scale out scenarios.

BIG DATA: Large volumes of data that need constant access is bound to hit physical constraints of disk IOPS (IO operations per second), network throughput, memory size etc. Hadoop, NoSQL, graph databases are platforms specifically designed to handle this. Ability to deploy on premise capacities at price points lower than similar public Cloud services will become a necessity when lifecycle management and compliances issues on Public Cloud are a hindrance.

VARIETY OF MANAGEMENT TOOLS: IT departments will need to augment their tool base to accommodate the management of the new devices and platforms. The tool ecosystem is yet to catch up with many of the popular devices, appliances, Open Source platforms and applications that are getting popular in the digital enterprise.

NEW OPERATIONAL PROCESS: Many existing operational practices need to be revamped to adapt to the changing world. The need is driven by rapid adoption of new technology, Cloud-based platforms, new development practices and the need for extreme agility. Operation platform centered on autonomics is going to be for the future.

DATA CENTER FACILITIES & DESIGN: Cloud is today establishing itself as an essential part of an enterprise's architecture building block. Hybrid Clouds with brokering capability will provide options for internal teams to analyze and procure resource from across the globe based on the workload profile. Private Cloud will have to be redesigned for compatibility to Public Cloud. OpenStack is emerging as a good choice alongside the established players. Also, there is a need for sensing capabilities at remote sites along with small and efficient data centers at those locations.

SECURITY DESIGNS: Traditional approach to security is going to be severely challenged as the scope for computing increases and information resides in devices and locations beyond the confines of data centers or enterprise boundaries. Securing device assets, trust management, mobile device management, network micro segmentation, etc. will have to be prioritized.

ACCOUNTING & MONETIZING: Wide unrestricted consumption of Cloud services across an enterprise is going to introduce new challenges around the billing, chargeback and entitlements. IT departments will be required to play the role of a broker to fulfil these requirements. Cloud service brokering tools with strong focus around commercials will become a necessity.

Conclusion

As businesses venture to embrace and adopt the innovations for its digital transformation, IT will need to rapidly adopt changes in technology, process, people and organization structure. In addition to the areas touched upon here, organization can actively collaborate with SIs and MSPs investing heavily in these areas. Next generation service operation platforms from these players come with many ready capabilities around these areas.

About the Author

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Saji Thoppil heads the GIS practice for Data Center Transformation & Enterprise Architecture at Wipro Limited. With more than 25 years of industry experience, he was the Chief Architect of Wipro's first public Cloud and is involved as chief architect in many large global transformation deals for Wipro. He has also contributed to many IPs of Wipro. His core specialization is in mission critical data centers. Saji is responsible for incubating reusable solutions, developing thought leadership, playing a CTO role and providing strategic direction in Wipro's large bids.

His global practitioner career spans Enterprise Architecture, System Integration, ITIL implementation and System Management & Automation.
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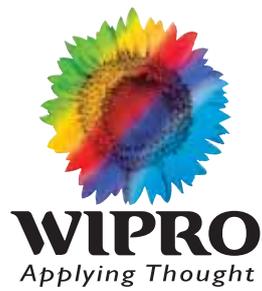
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