

Data Centers

at the core of

Digital Transformation

Data Centres

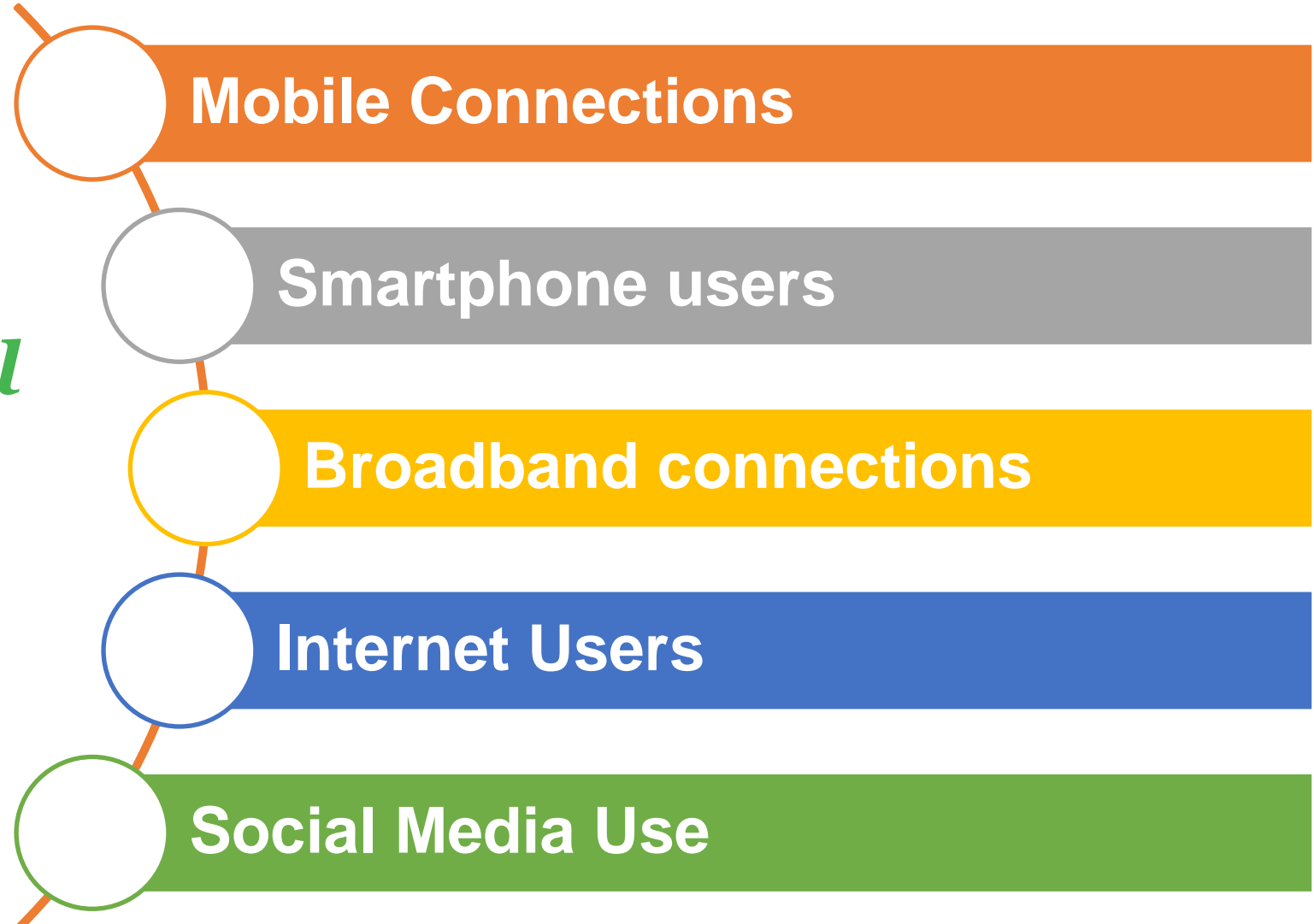
Evolution to Transformation



Data Centre Transformation : Driving Forces

Data..Data..Data..

*Exponential
Growth*



Data Centre Transformation : Driving Forces

Data..Data..Data..

**Internet of Things (IoT)
Connections**

Data Generation

Content Publishing

Data Collection



Goods & Services Tax
1.2 Crore registered users



Income Tax
6 crore tax payers



Passport Sewa
25 Crore



Soil Health Cards
11 Crore



70 Crore online service requests in 2017
like issuing caste certificates, licenses, etc.

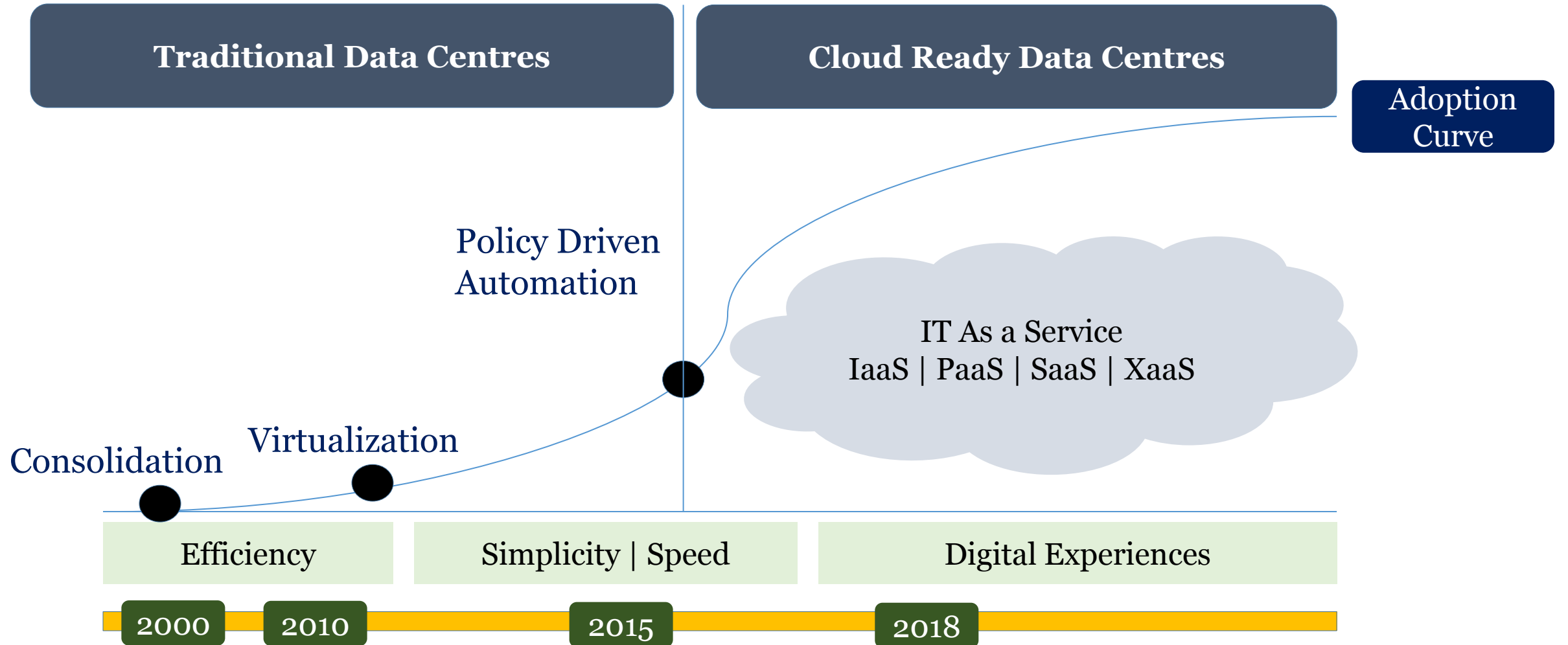
Data Centre Transformation : Driving Forces

Data
Localisation

Data
Availability

Data
Protection

Emergence of Cloud Computing



Cloud Deployment Models



NIC National Cloud – Meghraj

Set up in 2014.

**GoI's initiative to harness the benefits
of Cloud Computing**

**Cloud Set up in Govt. DC
managed & used by Govt.**

**Spans across NIC Data
Centres (pan India)**

Secure , Role based Access

*Since 2014, cloud
users on Meghraj
have grown by 100%
year on year*

NIC National Cloud – Meghraj

Major Projects on Meghraj

**PM Awaas
Yojana**

**Biometric
Attendance
(BAS)**

E-Courts

**Digital
Locker**

**JoSSA
(counselling)**

**ORS
(e-hospital)**

**Jeevan
Pramaan**

**National
Scholarship**

e-NAM

**Fertilizer
Subsidy**

**Public
Distribution
System**

**Government
Websites**

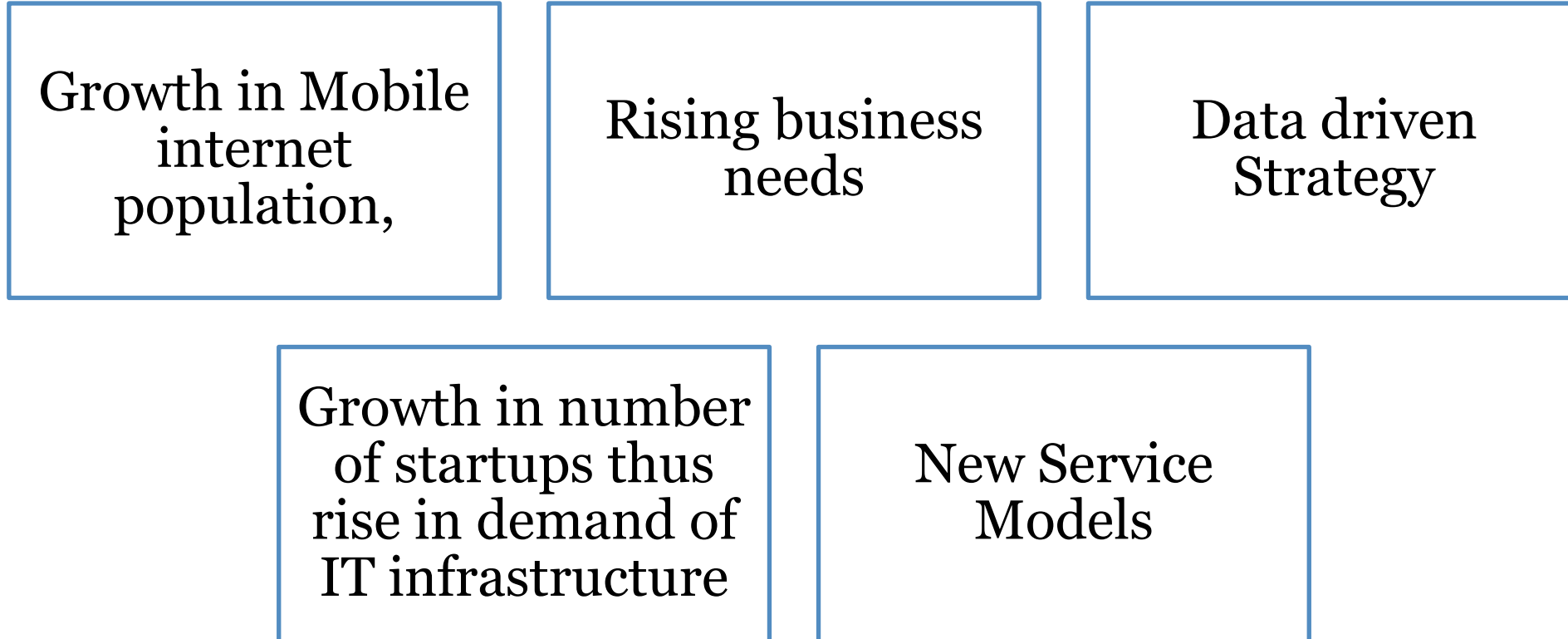
**Swacchh
Bharat**

E-Transport

**Soil Health
Card**

Digital Transformation

Data Centre is central to any Digital Strategy



India's data center market size is expected to touch US \$4.5 billion mark by Dec 2018

Digital India (An impetus to Data Centre Growth)

DIGITAL INDIA

KEY COVERAGE AREAS

Digital Infrastructure
as a Utility to Every
Citizen

Governance & Services
on Demand

Digital Empowerment
of Citizens

THE NINE PILLARS

I
BROADBAND
HIGHWAYS

II
MOBILE
CONNECTIVITY

III
PUBLIC INTERNET
ACCESS

IV
EGOVERNANCE -
Technology

V
EKKRANTI-
ELECTRONIC
DELIVERY OF
SERVICES

VI
INFORMATION
FOR ALL

VII
ELECTRONICS
Manufacturing

VIII
IT FOR JOBS

IX
EARLY Harvest
Programmes

e-Transport

Pan India Rollout

140 Million +
Driving Licenses Issued



Sarathi

250 Million +
Vehicles Registered



Vahan

2 Million +
E-challans Issues



E-Challan

1017 RTOs in
30 States



Vahan 4.0

958 RTOs in 27
States



Sarathi 4.0

Sarathi

Issuance of learner DL

Slot booking of tests

Modify and Cancel
Appointments

Camp Registration/
Driving School

International Permit

Vahan

Vehicle Registration and
Re-registration

Taxation, Fitness, Permit

Modify and add details

Duplicate RC,
Homologation

Smart card RC, Fancy
Number

E-Challan

Online/offline on the spot
challan

Dashboard with Dynamic
Reports

MIS and Analytics

Geo Tagging of Challan
Spot

Offence History

mParivahan

Virtual DL and RC

Accident and traffic
violation reporting

Citizen offence Report
System

Tow Reporting and
Disposal System

Road Accident Reporting

Public Finance Management System (PFMS)

Bringing efficiency, transparency & accountability

289 Million +
transactions during FY 18-19

11.74 Trillion +
transacted during FY 18-19



433
Govt. Schemes
(enabled for DBT)

232+
Bank Interface
pan India

Key Features



Government
Fund



Tracking of Funds



Interface with
State Treasuries

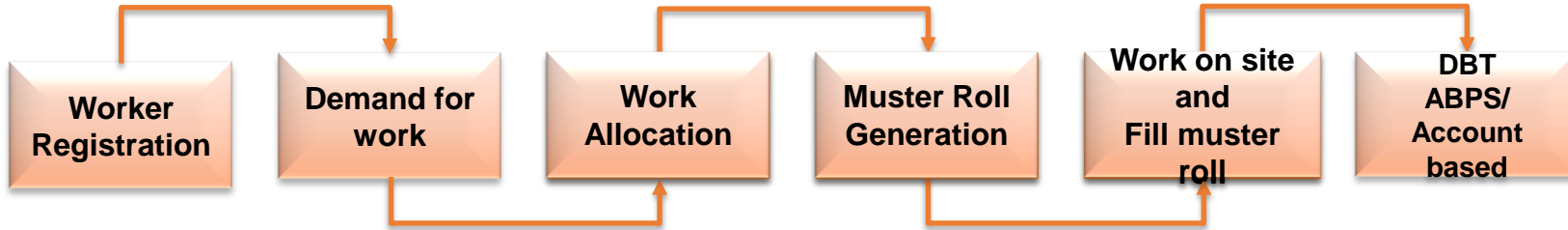


Digital Payments

MN REGA

Management Information System for NREGA

Flow of Activities



Internal checks for ensuring consistency and conformity to normative processes.



Geo Tagging



Mobile apps

Number of active workers

11.36 Cr

Man Days generated Per Month

19.5 Cr

Money disbursed per day

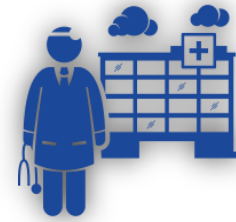
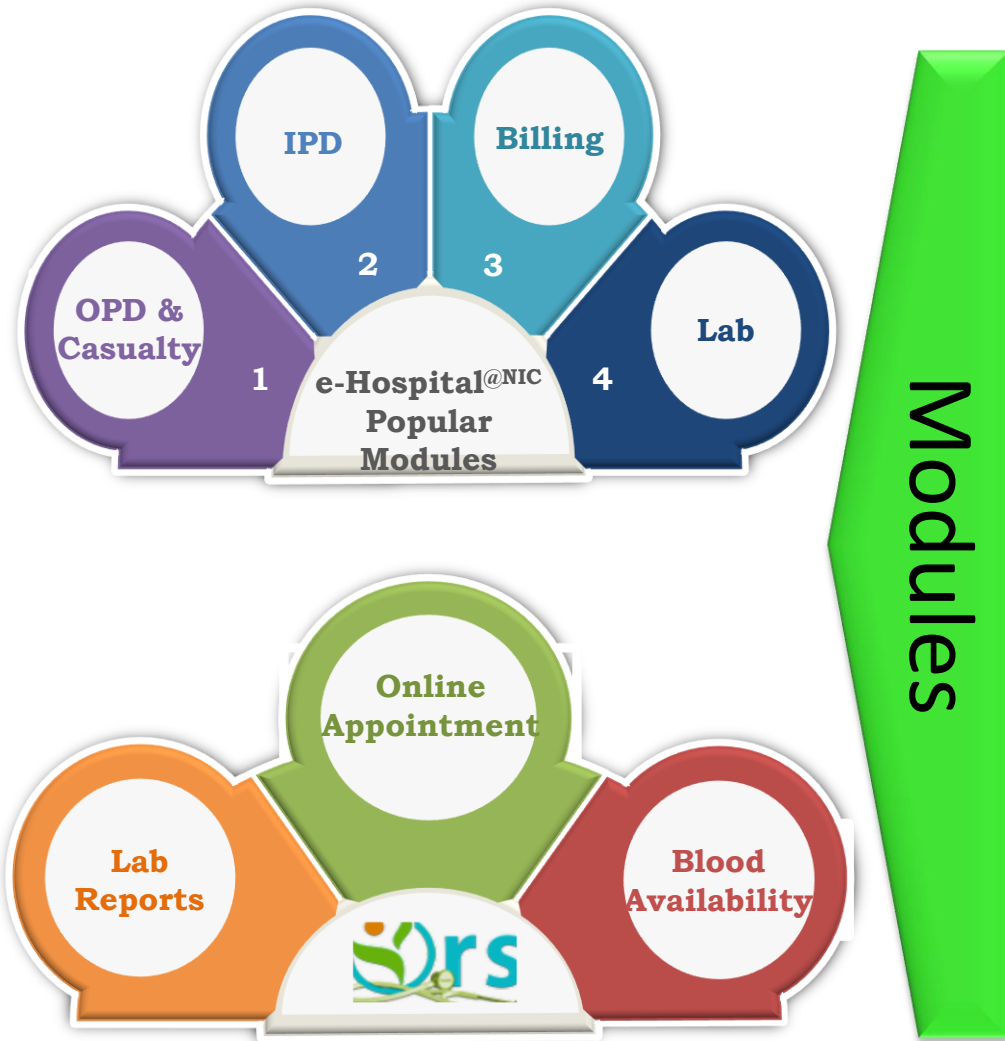
~160 Cr

Assets Created

3.19 Cr

E-Hospital

Simplifying Healthcare Service Delivery



**CLOUD BASED
HOSPITAL MANAGEMENT SYSTEM**

**240 Live Reporting
Hospitals**

**93 Hospitals are in
Pipe-line**

323+
Total Hospitals
On-boarded

3 Million+
Patients
Registered in
August 2018

177
Total Hospitals
on Boarded on
ORS

50. Million+
Patients
Registered since
Sept '15

51 K +
Patients
Registered on 16th
Sep 2018

1.7 Million +
Online Appointments
taken since July
2015

Emerging Technologies

**Artificial
Intelligence**

**Machine
Learning**

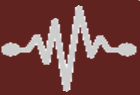
**Block-
chain**

**Big Data
Analytics**

Expectations from Data Centres



Super computing power for seamless, real time Customer Experience



Dynamic Provisioning of Infrastructure



Automation of Management & Configuration of Virtual Networks



Cloud based computing power to the Edge



Seamless Integration b/w workloads distributed in Cloud & On premise

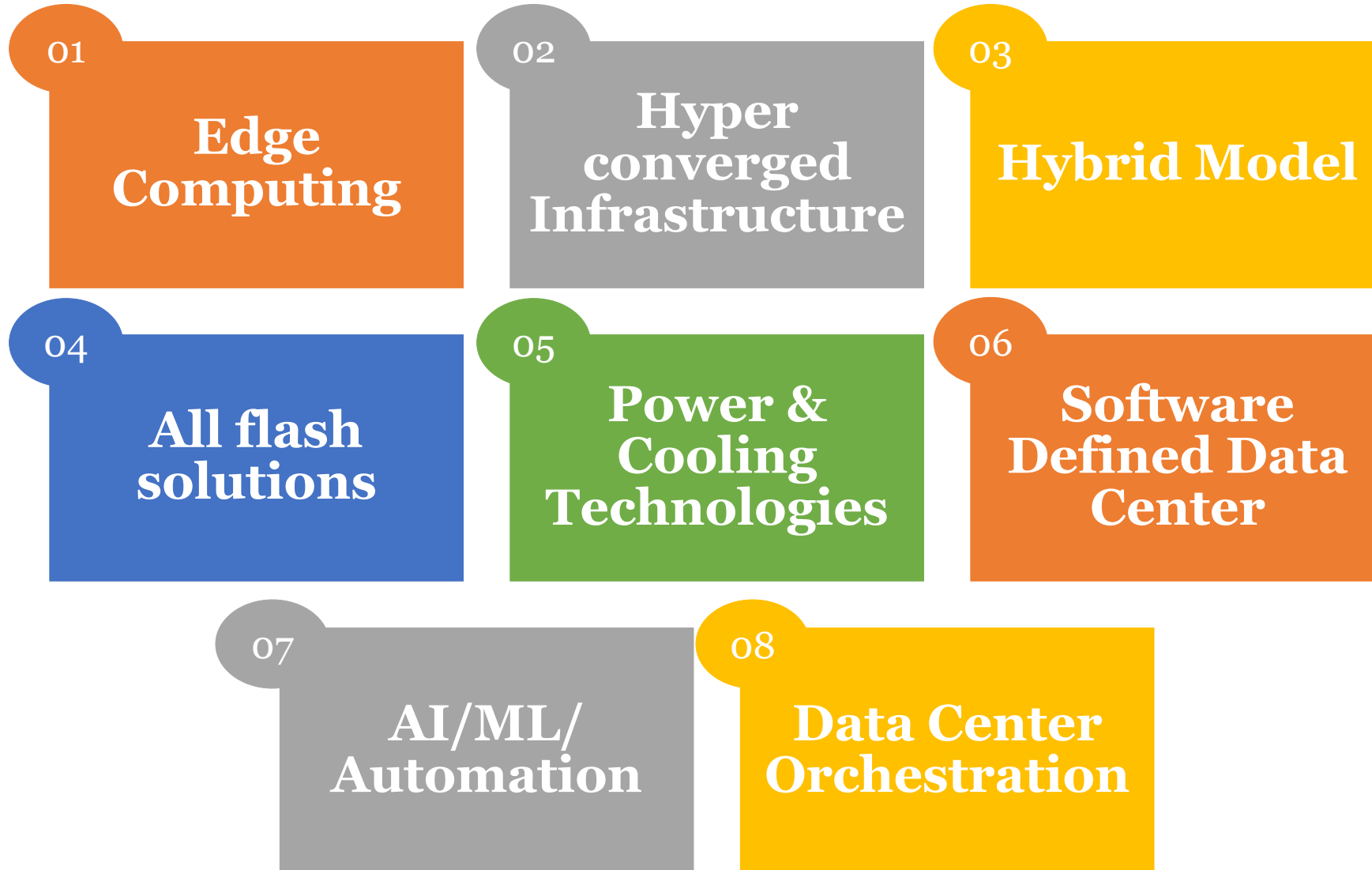


Cost & Operational Efficiencies



Security & Regulatory Compliance

Data Center Transformation - Enablers

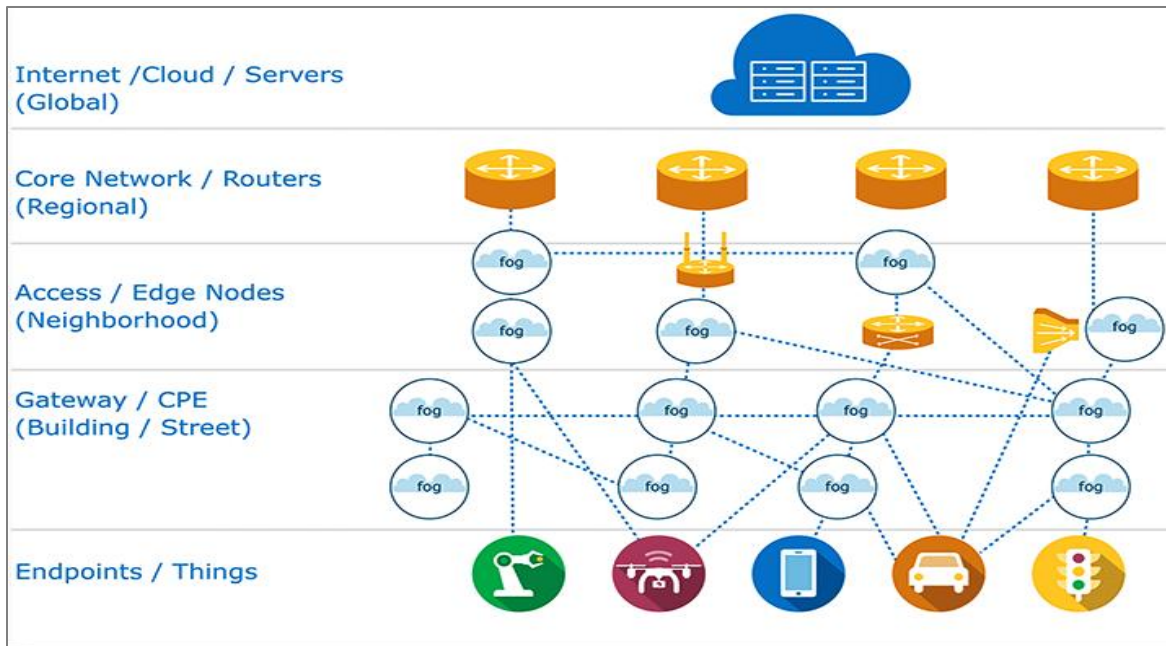


Edge Computing: State of next Cloud Transformation

Edge Computing (type of fog computing) keeps processing and analysis near the edge of a network, where the data was initially collected.

The goal of Edge computing is to boost the performance and reliability of apps and services, and reduce cost of running them, by shortening the distance data has to travel, thereby mitigating bandwidth and latency issues.

Edge Computing Ecosystem



Edge Computing Market dynamics

Drivers

- Increased load on cloud infrastructure
- Varied applications for diff. industries
- Growth in intelligent applications

Opportunities

- Introduction of 5G network

Concerns

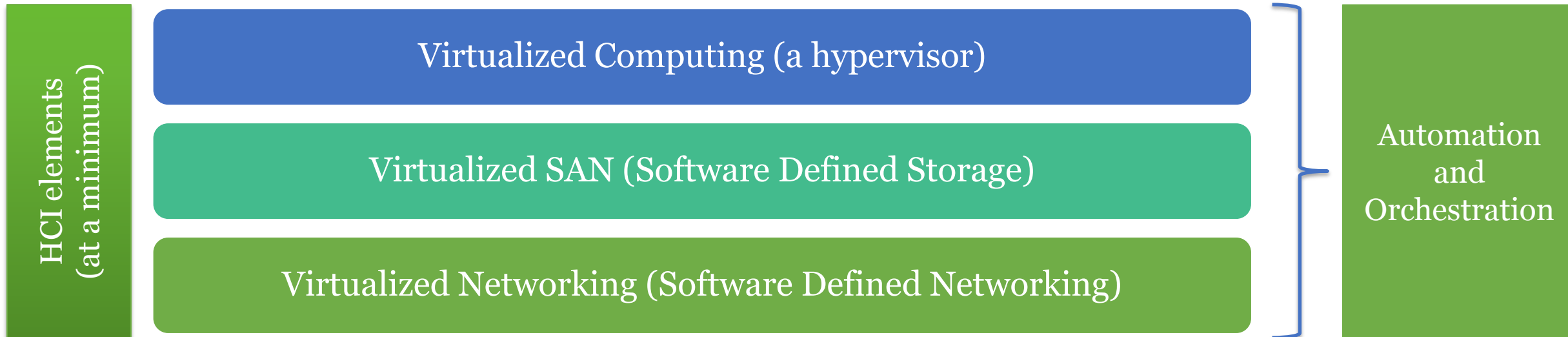
- Security Concerns
- Privacy Concerns

Challenges

- Inadequate Industry standards
- Interoperability issues

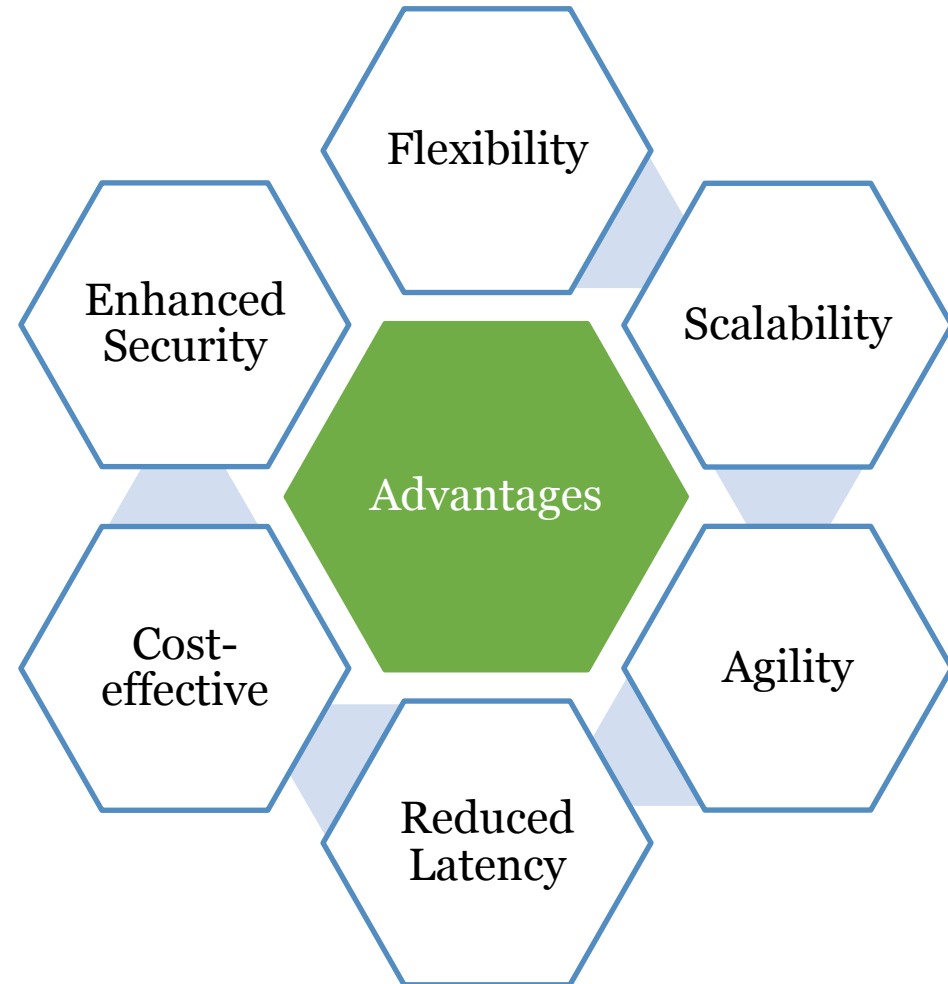
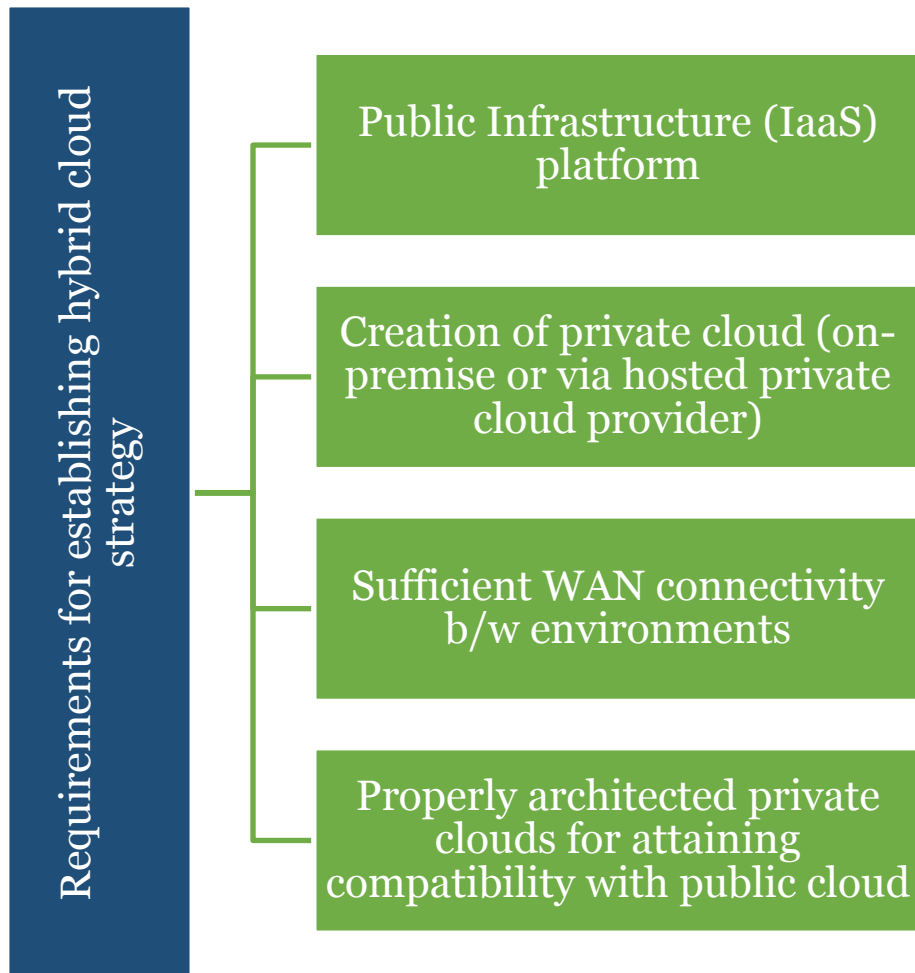
Hyper Converged Infrastructure (HCI)

Software-defined IT infrastructure that virtualizes all elements of conventional "hardware-defined" systems



Hybrid Model

Composition of two or more clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability



All Flash Array (AFA) Solutions

An external storage array that uses only flash media for persistent storage.

Key Considerations when leveraging all flash technologies as part of data center design strategy:

All-flash are purpose-built arrays that enable a reduction in data center power and cooling.

More Resilient ecosystem

More capabilities for converged infrastructure

For latency sensitive workloads, Flash offers

Performance

Capacity

Storage
Density

Efficiency

Energy &
floor space
consumption

Operational Efficiency in Data Centre Infrastructure

Liquid based Cooling

CFD Analysis

Hot/ Cold Aisle Containment

DCIM Tools

Smart power grid

Software Defined Infrastructure

Operation & Control of IT Infrastructure using Software Technologies

Self-aware, self-correcting, self-scaling and self-optimizing IT environment to enable agile processes



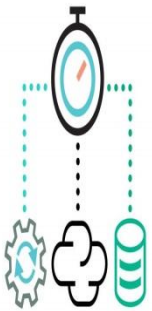
Infrastructure Control

- Hardware resources (servers, networking devices, etc.) scaled on ongoing basis



Virtualization Layers

- Heterogeneous architecture of computing resources. Virtualization of storage, network, server, etc.



Software Defined Capabilities

- Software Defined Networking, Compute and Storage. Intelligent infra and resource virtualization configuration systems



Management Provisioning

- User-interface to define parameters such as SLA performance, availability, scalability and elasticity

Data Centre Orchestration

Orchestrated operations is a concept that uses the tools in place along with a process driven workflow to get maximum benefit for the data centers

Need of orchestration for delivery of cloud services

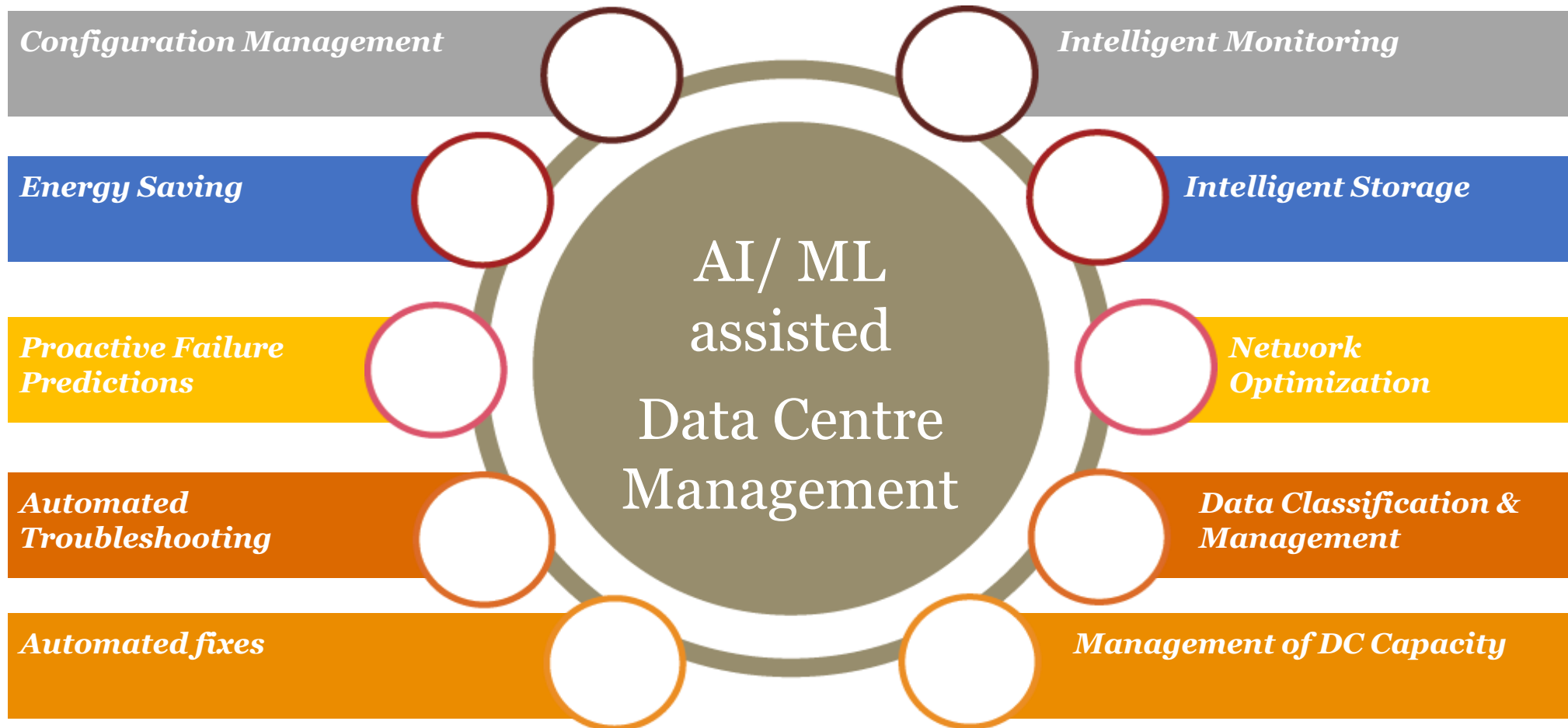
- Cloud services scale-up arbitrarily and dynamically
- Cloud service delivery includes fulfillment assurance and billing
- Cloud services delivery requires workflows in various technical and business domains

Elements for cloud service orchestration

- *Composing* of architecture, tools, and processes
- *Stitching* of software and hardware components together to deliver a service
- *Connecting and Automating* of workflows when applicable to deliver a service

AI/ML/Automation Integration with Data Centre infrastructure

Leveraging technologies such as AI and ML to optimize data centres can help make them more efficient and efficient in terms of operational efficiency, data classification and management, and design optimization.



Data Centre Security

Physical Security

- Surveillance Cameras
- Full authentication & access policy control
- Biometric control & access

Cloud Security

- Protecting data using encryption
- Multiple step authentication
- Analytics & Machine Learning to tweak configurations

Network Security

- Threat Detection via Machine Learning
- Multi cloud security orchestration
- Network-based security tools such as firewalls, IPS etc.

End Pont Security

- SaaS based endpoint security
- IoT devices under security umbrella
- Layered defense against fileless attacks by Machine Learning and AI

Application Security

- DevSecOps approach
- Apply security measures to each application component
- Use of cloud based security products
- Automation of installation and configuration of security components

Reliance on Data Centres shall continue to Grow....

Data Centre Industry has a promising Future in India

Skilled
Manpower

Make in India

Multi Gigabit
Networks

Power Tariffs

Renewable
Energy
Sources

Ease of doing
Business

Thank You !

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