Digital Transformation in the Age of Cloud, Big Data, Mobile and Social

PK Gupta
Senior Director and Chief Architect
EMC Data Protection and Availability Div
Asia Pacific and Japan
My Introduction

- Full Name – Pushpendra Kumar (PK) Gupta
- B. Tech (computer science) and MBA with 29+ years of IT industry experience.
- First 17 years in R&D and last 12+ years in Product marketing and pre-sales
- 5 years in Govt, 7 years in RRSG including 5 years in IBM, last 17 years in Legato/EMC and counting
- Visiting professor in many India colleges from last 18 years and in international advisory board of 5 universities
- International Speaker and written 100s of articles
- Travelled to 50+ countries
- Founding Chairman of SNIA India and current Chairman of SNIA South Asia. In 2013, became 1st Asian to receive 2012 SNIA Industry Impact Award in SFO
- Received 1st 2013 APJ EMC President Leadership Award
We Have Entered The Second Machine Era

Creating Value From Information *Is* The New Economy
The Digital Universe Is Huge — And Growing Exponentially

In 2013, there were almost as many bits in the Digital Universe as stars in the physical universe.

4.4 ZETTABYTES

2013

If the Digital Universe were represented by the memory in a stack of tablets, in 2013 it would have stretched two-thirds the way to the Moon.*

44 ZETTABYTES

2020

By 2020, there would be 6.6 stacks from the Earth to the Moon.*
Emerging Markets Will Surpass Mature Markets by 2017

% of TOTAL DIGITAL UNIVERSE

<table>
<thead>
<tr>
<th>Year</th>
<th>Emerging Markets</th>
<th>Mature Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>2013</td>
<td>30%</td>
<td>70%</td>
</tr>
<tr>
<td>2014</td>
<td>20%</td>
<td>80%</td>
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<tr>
<td>2015</td>
<td>10%</td>
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<td>2016</td>
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<td>10%</td>
<td>90%</td>
</tr>
<tr>
<td>2019</td>
<td>20%</td>
<td>80%</td>
</tr>
<tr>
<td>2020</td>
<td>30%</td>
<td>70%</td>
</tr>
</tbody>
</table>

In 2013, mature markets represented 60% of the Digital Universe

By 2020, that will flip-flop, with emerging markets (including China, Brazil, India, Russia, and Mexico) representing 60%
The Digital Universe

Less than 1% of the World’s Data is Analyzed
On the planet there are 6+ BILLION mobile subscribers.

But only 4.5 BILLION toothbrushes
Who are the Key Drivers of Digital Information Creation?

• Individuals
  - Multimedia
  - Mobile Apps, Texting
  - File Storage
  - Music Downloads
  - Gaming
  - Documentations
  - Photography
  - Podcasts, Movie Downloads
  - E-Mail Attachments

• Companies?
  - Retail/Banking
  - Customer Service
  - Market Trading
  - Travel
  - Medical / HealthCare
  - E-Government
What Happens in an Internet Minute?

- 639,800 GB of global IP data transferred
- 204 million Emails sent
- 204 million New mobile users
- 20 New victims of identity theft
- 100+ New LinkedIn accounts
- 5,830,000 In sales
- 1,300 New mobile users
- 1,300 New Wikipedia articles published
- 135 Botnet infections
- 277,000 Logins
- 2+ million Search queries
- 30 Hours of video uploaded
- 1.3 million Video views
- 61,141 Hours of music
- 61,141 Photo views
- 20 million Photo uploads
- 320+ New Twitter accounts
- 3,000 New tweets
- 100,000 New tweets

And Future Growth is Staggering


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A Perfect Storm...

Turn of the century technology
Massive convergence
Device explosion
Pervasive connectivity
Global workforce
Consumerization
Social media
IS IT REDEFINING?

**Digital Universe.** Information growth 10x/7yrs

**Data Drivers:**
Cloud, Mobile, Big Data, Social

**Emerging Markets**

Data touching **Cloud** <20% in 2013 to >40% by 2020

**Mobile Device**
from 20B to 50B in 2020.
Millions of **Mobile Applications** (50 x 3 x 300K)

**Fast Data.** 200B Telemetry Sensors to 1Trillion/10yrs

**Security.** Phishing attacks grew 87% Y/Y. (3 of 10 Top Attacked Countries in APJ)

**Data Protection.** 52% of world's information needing protection is unprotected

**IT Pros.** Only 28% more IT Pros (28M to 36M) over 7yrs to manage 500% more

Our Time. Opportunity is **MASSIVE.**
And It Is Not Going To Get Any Easier!!!

Source: IDC, 2012
WAVES OF CHANGE
Latest Gartner Hype Cycle 2014
New IT Agenda

- Provide Access To All Applications & Data Through Mobile Devices.
- Use Agile Development To Build New Customer-Centric Applications.
- Build A Data Lake To Deliver Insights And Applications On All Data.
- Move To A Software-Defined Data Center Infrastructure And Expand It To A Hybrid Cloud.
- Use Adaptive, Data-Driven Security To Rapidly Respond To Emerging Threats.

Today’s Business Challenges

- Cut Operational Costs & Legacy More Than Ever
- React Faster To Find New Growth
- Balance Risk
- React Faster To Find New Growth
CLOUD
IS TRANSFORMING I.T.

BIG DATA
IS TRANSFORMING BUSINESS
Why Transformation?

Business is Changing Faster Than IT

Business Has New IT Alternatives

Technology Convergence is Accelerating
As ALL Businesses Become More IT Intensive, 
There Are Real Business Reasons To Transform

**COST**
- IT Budgets are not expanding
- The desired Balance for Capex/Opex is shifting
- IT labor must be optimized

**AGILITY**
- New Application Time To Market must be accelerated
- The Business needs IT to start with the business problem in mind, not with a technology solution
IT As A Service Can Deliver Dramatic Cost Savings

**IT Cost Comparison**

(% of Total IT OpEx Budget)

- **Legacy** - 100%
  - Cloud Services: 33
  - External Services: 20
  - Internal Services: 14
  - Software: 6
  - Hardware: 27

- **ITaaS** - 76%
  - Cloud Services: 4
  - External Services: 22
  - Internal Services: 14
  - Software: 9
  - Hardware: 4

Source: McKinsey, Gartner, EMC analysis

**Innovation Spending**

(% of IT Budget)

- **Legacy** - 28%
- **ITaaS** - 40%

Source: Forrester, EMC analysis
Enterprise IT’s Monopoly on IT Services is Eroding

How frequently are lines of business at your organization turning to outside service providers when they need IT services?

LOB USE OF OUTSIDE SERVICE PROVIDERS

<table>
<thead>
<tr>
<th>Frequency</th>
<th>IT</th>
<th>Business</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently - More than 50% of the time</td>
<td>13%</td>
<td>12%</td>
</tr>
<tr>
<td>Occasionally - Between 25% and 50% of the time</td>
<td>46%</td>
<td>41%</td>
</tr>
<tr>
<td>Rarely - Less than 25% of the time</td>
<td>32%</td>
<td>41%</td>
</tr>
<tr>
<td>Never</td>
<td>9%</td>
<td>5%</td>
</tr>
</tbody>
</table>

>50% of all respondents report using outside service providers, citing faster service delivery and the ability to leverage technical expertise.

TOP ATTRACTIONS FOR LOB TO LEVERAGE OUTSIDE SERVICE PROVIDER

- Faster service delivery/time to market: 41%
- Ability to leverage technical expertise not available in-house: 41%
- Lower costs: 40%
- Better application performance: 32%

Source: IDG Research Services/CIO Custom Solutions Group, Big Picture Global Survey: Dual Perspective of ITaaS, A survey of IT and business executives, June 10, 2013
Transforming Into a Service Broker

NEW IT BUSINESS MODEL
Service Oriented
Market Driven
“P & L” Focused
Broker & Builder

NEW TECHNOLOGY ARCHITECTURE
Private, Hybrid, Public Clouds
End-To-End Automation
Financial Transparency
Self-Service Capabilities

DNA, SKILLS, ROLES & ORGANIZATIONAL ALIGNMENT
“Front Office” Capabilities
Service Accountabilities
Technology Breadth
## ITaaS Main Attributes

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-Service</td>
<td>Self-service catalog through user portal. Automated, traceable service requests &amp; fulfillment</td>
</tr>
<tr>
<td>Service Oriented</td>
<td>Standardized planning, design, delivery and operation of services. IT partners with LOBs.</td>
</tr>
<tr>
<td>Highly Automated</td>
<td>Standardized technology architectures allow for deep automation and workflow orchestration.</td>
</tr>
<tr>
<td>Financially Transparent</td>
<td>Services consumption is measured and reported back to user (LOB). Tiered services with different SLAs and costs.</td>
</tr>
<tr>
<td>Consumerized</td>
<td>Access to services through device of choice.</td>
</tr>
</tbody>
</table>
Transforming to ITaaS

Align Workloads With Most Suitable Cloud Model And Empower Them For Mobile And Big Data Solutions

Build a Cost-Efficient, Agile Infrastructure to Enable Private and Hybrid Cloud

APPLICATION TRANSFORMATION

End User Experience

2nd Platform Existing Apps

3rd Platform New Apps

APPLICATION FABRIC

DATA FABRIC

CLOUD FABRIC

OPERATING MODEL TRANSFORMATION

User Portal

Service Catalog

Policy Engine

Orchestration Engine

Metering Engine

New Roles

INFRASTRUCTURE TRANSFORMATION

PUBLIC

HYBRID

PRIVATE

LEGACY

Package And Orchestrate Services For Agile IT Operations And Convenient Consumption

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APPLICATION FABRIC

DATA FABRIC

CLOUD FABRIC

USER PORTAL

SERVICE CATALOG

POLICY ENGINE

ORCHESTRATION ENGINE

METERING ENGINE

New Roles

INFRASTRUCTURE TRANSFORMATION

PUBLIC

HYBRID

PRIVATE

LEGACY

Package And Orchestrate Services For Agile IT Operations And Convenient Consumption
Evolution of “As A Service”

- AaaS
- BaaS
- CaaS
- DaaS
- EaaS
- FaaS
- GaaS
- HaaS
- IaaS
- KaaS
- LaaS
- MaaS
- NaaS

- OaaS
- PaaS
- QaaS
- RaaS
- SaaS
- TaaS
- UCaaS
- VaaS
- VSaaS
- WaaS
- XaaS
- YaaS
- ZaaS
Workloads Drive Innovation and Have Different Service Levels

- Low Service Level
  - Storage As-A-Service
  - Online Archive
  - Web Content
  - Home Directories

- High Service Level
  - On Prem
  - Desktop Virtualization
  - Transaction Processing
  - VM Infrastructure
  - App Dev
  - Email

- Performance

- Capacity

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Application Workload Growth 2012-2016

Next Gen Cloud Applications
- HDFS / Object Storage
- Eventual Consistency
- Software-Based Resiliency

2012: 6M → 2016: 48M (700%)

Traditional Applications
- Block / File Storage
- Transactional Consistency
- Hardware-Based Resiliency

2012: 83M → 2016: 141M (70%)

Sources: IDC, Gartner, AWS Workload Estimates*
The Software-Defined Data Center

Lowers Cost & Improves Agility Of The Infrastructure

Virtualization Layer - Cloud Operating System

Leverage Intelligence

COMPUTE

STORAGE

NETWORK
New Apps Are Built In New Ways

Social & Primarily Accessed By Mobile Devices

Developed With Modern Programming Tools & Data Fabrics

Deployed On A Software-Defined Cloud Infrastructure
New Apps For Big (& Fast!) Data

Enterprise
- Structured Data
- Unstructured Data
- Telemetry Data

Partner
- Credit Data
- Shipping Data
- Forecast Data
- Location Data

Public
- Social, Video Data
What is Big Data?

Data collected is more than 100 TB

Data is received via ultra-high-speed streaming

Data generated at >60% per year

Deployed on dynamically adaptable infrastructure

Two or more data formats and/or sources

High-speed streaming data

Big Data is about data Volume, Velocity, Value and/or Variety

Source: IDC 2013
And Self Driving Cars
Data Scientist: The Sexiest Job of the 21st Century
Industries Are Broadly Embracing Data Science

**Retail**
- CRM – Customer Scoring
- Store Siting and Layout
- Fraud Detection / Prevention
- Supply Chain Optimization

**Financial Services**
- Algorithmic Trading
- Risk Analysis
- Fraud Detection
- Portfolio Analysis

**Manufacturing**
- Product Research
- Engineering Analytics
- Process & Quality Analysis
- Distribution Optimization

**Government**
- Market Governance
- Counter-Terrorism
- Econometrics
- Health Informatics

**Advertising & Public Relations**
- Demand Signaling
- Ad Targeting
- Sentiment Analysis
- Customer Acquisition

**Media & Telecommunications**
- Network Optimization
- Customer Scoring
- Churn Prevention
- Fraud Prevention

**Energy**
- Smart Grid
- Exploration & Production
- Refining & Marketing

**Healthcare & Life Sciences**
- Pharmaco-Genomics
- Bio-Informatics
- Pharmaceutical Research
- Clinical Outcomes Research
Requirements for Next Generation

- **Apps** power businesses, and those apps generate **data**
- **Analytic** insights from that **data** drive new app functionality, which in-turn drives new data
- The faster you can move around that cycle, the faster you learn, innovate & pull away from the competition
Data Lake
Cloud Meets Big Data

“The ability to take data – to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it – that’s going to be a hugely important skill in the next decades.”

Hal Varian, Chief Economist, Google
Target CIO Resigns Following Massive Data Breach

MARCH 05, 2014 08:06 BY SARAH PEREZ
Compliance and Governance Requirements

• Largest Legal and Regulatory Requirements study conducted in Asia

• Includes Australia, New Zealand, Hong Kong, Japan, Korea, China, Taiwan, Macau, India and South East Countries (Indonesia, Malaysia, Vietnam, Philippines, Thailand, Singapore)

• Essential information for Global, Multi-National and any Organization that is impacted by legal and regulatory requirements

MONETARY AUTHORITY OF SINGAPORE WEIGHS IN ON TECHNOLOGY RISK MANAGEMENT ISSUES

• July 9, 2012 - System failure, cyber-attacks, internal sabotage, payment card fraud and cloud outsourcing are the top five technology risks faced by Singapore FSI in 2012.
The motivation to move from a CAPEX model to an OPEX driven service will change the underlying tax implications greatly. Has a right be transferred?

Many jurisdictions have been rewriting their "digital" laws to address cloud related issues.

- Copyright
- Intellectual Property Rights
- Breach Laws, Notification and Consent
- Personal Data Privacy
- Cybercrime Laws
- Extraterritorial Jurisdiction
- Regulatory Bodies

There is no single approach or harmonized set of laws on a global (or regional) scale.

36% / 46%
US Providers / US Businesses

The motivation to move from a CAPEX model to an OPEX driven service will change the underlying tax implications greatly.

Has a right be transferred?
“The future is already here — it's just not very evenly distributed” – William Gibson

http://intergalacticrobot.blogspot.co.uk/2012/06/helen-oloy.html
My Roadmap to Success

1. Focus on the Cultivating Relationships
2. Focus on your Strengths & Maximizing them
3. Learn from Mistakes, and Move on
4. Can do Approach
5. What you think depends on where you sit
6. Learn when is it good enough than late and perfect
7. Doing Things Differently then others will make you Leader
8. Train yourself to multitask and invest in your own development
9. There are no Shortcuts to Success without Hard work. It is only Dictionary where Success comes before Sweat

Honesty is not only the best Policy – it’s the ONLY Policy.
Insights into Super Success

• **Think Big** - Your Goal x 10
• **People** – Multiply your capacity through team
• **Hard work** – Push yourself (80 to 100 hr a week including your development time)
• **Focus** – Insane Focus
• **Failure** – Take risk and challenge yourself
• **Growth** – Invest in yourself. Become obsessed with your learning.

#1 Threat/Danger of 21st Century - Distractions
Most important skill for 21st Century - Attention
Thank You and Best Wishes

Above All Have Fun!
THANK YOU

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