

# CLOUD COMPUTING & GREEN IT

## White Paper

**At the inauguration of**

**One Day National Summit on**

**Cloud Computing & Green IT Technology**

**10<sup>th</sup> December 2010**

About Summit: Cloud Computing is one of the most popular topic in the ICT sector today. Cloud computing means integrated, dynamic infrastructures that deliver IT as a service either internally (private cloud) or externally (public cloud). It is important to understand the trade-offs among Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS), and between public and private clouds. Imagine the possibilities for your organization if you could continue to build your virtualized environment into a fully automated, service- oriented infrastructure of pooled resources (server, storage, and network) that enables you to easily deliver IT Services to your internal users.

There are at least three advantages to optimizing the use of a shared IT environment:

- Tremendous agility
- Extreme efficiency
- Maximum Utilization

It consolidates your environment, saving power, cooling, and space, as well as money. Cloud offers a future-proof platform that can grow no disruptively as your business requires. This means that you can roll out new applications faster, be more responsive to customer needs, and reduce IT costs on a large scale by deploying a highly efficient infrastructure. The cloud computing architecture is comprised of two significant parts: the front end and the back end. The front end is the side at which the user of the computer or the client himself is able to access. The cloud computing overview might have projected two primary concerns with the use of the cloud computing platform: security and privacy. Green Computing is especially important and timely: as computing becomes increasingly pervasive, the energy consumption attributable to computing is climbing, despite the clarion call to reduce consumption and reverse greenhouse effects. This is forcing the IT leaders to focus on efficiency and total cost ownership, particularly in the context of the world-wide financial crisis.

To deliberate on these issues, Computer Society of India, Delhi Chapter decided to organize a One day National Summit on “Cloud Computing & Green IT Technology” at Delhi. This will help to develop strategies and a scientific approach for implementation of Cloud Computing & Green IT Technologies.

The rest of this paper attempts to go deep into these concepts, but some that have not been touched upon in general, for example the job scenario around the cloud.

While we are not sure of the origin of the statement, it is said that Larry Ellison, co-founder and CEO of Oracle, has stated: “The interesting thing about cloud computing is that we’ve redefined cloud computing to include everything that we already do...The computer industry is the only industry that is more fashion-driven than women’s fashion...It’s complete gibberish. It’s insane. When is this idiocy going to stop?”

While there are number of surveys and reports available globally to press upon the need of virtualisation, cloud computing and greening of IT, here is a piece from Indian scenario.

“India will witness a 60-fold increase in the creation of digital information over the next decade on the back of the government’s digitization efforts, technological advancements and the growing penetration of mobile phones, says a report.

The country is likely to create 2.3 million petabytes of digital information by 2020, up from 40,000 petabytes today, predicts the joint study by information infrastructure solutions company EMC Corp. and market researcher IDC.”

“Rather than a revolution, cloud computing is an important transition, a paradigm shift in IT services delivery – one that has broad impact and can present significant challenges. Cloud computing represents a transformation in the design, development and deployment of next generation technologies – technologies based on flexible, pay-as-you-go business models that will alter the future of computing from Mobile Platforms to Data Center.” : Intel.

Intel also believes that to make Cloud Computing a success, individual organisations and the IT Industry as a whole will need to focus on four areas:

- Efficiency
- Simplification
- Security
- Open Standards

A lot has been said about ‘what is cloud’ and ‘the benefits of cloud’, but the CGI Group has recently focused on a different aspect – billing in the cloud. It says “The very nature of cloud computing is the ultimate flexibility—any resource in any volume and at anytime.” But this flexibility must exist in Billing too. They go on to say:

“Many cloud items need to be sorted out to fully meet the promise of cloud computing. Flexibility in billing is one of them. Ignoring this aspect will mean that the cloud provider doesn’t reflect its true

costs in the customer model, which in turn is likely to either impact the provider's competitiveness through overcharging or its survival through undercharging. Supporting this functionality allows the provider to aggregate data and to understand usage patterns. This is important for capacity planning as well as offering analysis for sales and marketing. To fulfil the promise of cloud computing and charge per usage, flexibility in billing—the complexity of which is comparable to convergent telecom billing—is a key ingredient for cloud providers.”

According to some news items, “Cloud computing will take hiring sky high” – this means Cloud Computing is really Green! As the IT industry moves towards game-changing technologies, a cloud eco-system is slowly developing in the country with technology companies ramping up hiring and training for cloud computing.

Around three lakh more IT jobs will be created in India around cloud computing by 2015, says a study by Zinnov Management Consultancy. And some of that has already started happening. According to Ms Nirupama V. G, Managing Director, Ad Astra Consultants, there has been a 25 per cent spike in hiring mandates thanks to cloud computing.

It is early days yet, with companies still at the “strategy level”, but the momentum is surely picking up with significant hiring expected to happen in the next two quarters, says Mr Rishi Das, CEO, CareerNet, an HR consulting firm. And it is not just the big companies that are on the prowl; SMEs developing applications for the cloud will also bid for talent in the coming quarters.

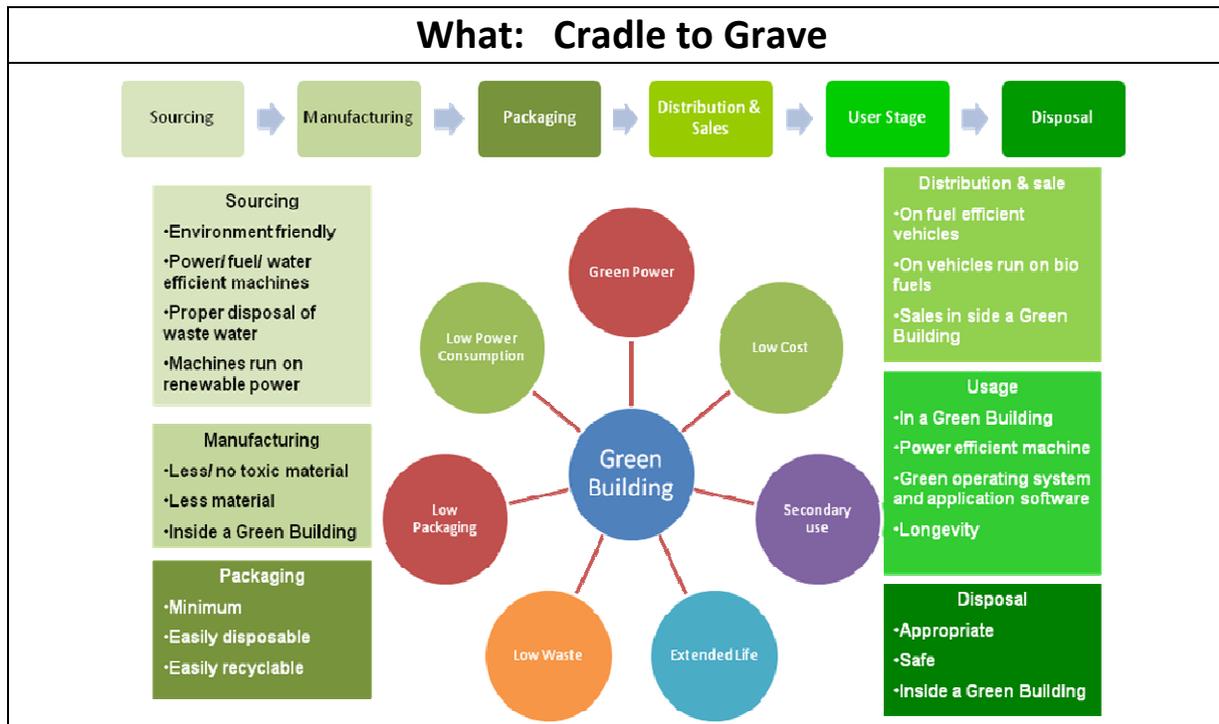
### **Some reasons for Green IT**

The combined printer, copier and multifunctional product (MFP) market in India has witnessed a growth of 39.9 per cent, showed data revealed from Gartner, leading information technology research and advisory company.

According to Gartner, the market totalled nearly 0.8 million units in the second quarter of 2010, compared to the corresponding quarter of 2009.

Sam Pitroda, the prime minister's advisor on public information infrastructure and innovations, said recently: “India is likely to end up spending around \$20 billion on the current overhaul of its IT infrastructure.” If this is true, then “there is lot to be Greened in IT”.

**Green IT: Information Technology that is light on all resources (covering cradle to grave stages) is Green IT**



IMPLEMENTATION OF GREEN IT IS EXPECTED TO HELP AN ORGANIZATION IN MULTIPLE WAYS E.G.:

- Save CAPEX and operating costs, and help improve ROI
- Enhance brand image with respect to environmentally sensitive clients (and insensitive competitors), and also for the general public
- Enhance stakeholder value and satisfaction
- Enhance employee morale and retention
- Help ensure regulatory compliance
- Improve corporate governance and sustainability

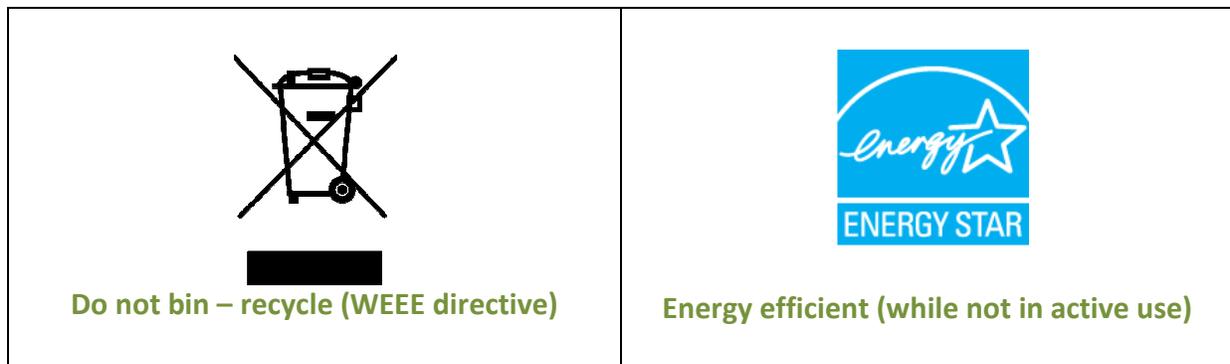
SOME LIVE EXAMPLES (INFORMATION AVAILABLE IN PUBLIC DOMAIN):

- **Australian Department of Defence** (Gershon Report)
  - Automatic log off and shut down of PCs reduced machine hours from 50000 hrs to 3000 hours. The result was savings in electricity of over \$5 million annually, with a decrease in GHG of more than 30000 tonnes annually (equates to 7 500 cars off the road per annum).
- **Dell**
  - A tool based switch-off/ switch on change over 50000 desktops across the globe helped DELL to reduce its energy consumption by 40%, translating to USD 1.8 m per year
- **Microsoft**, through a virtualization project, reduced 700 servers to 4 – the energy, emissions, maintenance cost reductions can easily be understood
- **Sustainability Victoria**, by a blade server implementation project, reduced its power consumption by 68%
- **Toyota Australia** - Savings potential of 43% with respect to IT cost, GHG and electricity consumption through the implementation of office-based IT equipment initiatives.
- **Intel** – saved \$US45 million by consolidating and replacing servers thus avoiding new data centre construction, and saved \$US 95 million through Data Centre efficiency program.

- **TCS** - Going Paperless with online forms, business processes and workflows yielded a significant reduction in paper consumption for its operations. Measures to enforce double-sided printing, shared printing services and recycling printer cartridges led to a 28% reduction in paper consumption and a 68% reduction in printer cartridges in 2007 compared to the prior year.
- **Infosys**, through a large Green IT Program covering server and storage consolidation, blade server rollouts, and virtualization, gained the following financial benefits:
  - Direct cost savings of US\$ 130,000
  - Annual savings of US\$ 70,000 on data centre maintenance costs
  - Reduced server count by 98%, achieving significant cost reduction
  - Reduced Total Cost of Ownership
  - Annual energy cost savings up to US\$ 100,000

All above, we believe, are examples of Healthy Business via Healthy Environment!

Hence, we conclude by saying that it makes sense to go Green, IT is a great enabler and Cloud Computing is a step towards that. But, we should not 'Green Wash' any one, neither should we be 'Green Washed' by someone else, understand the real meaning of some of the symbols used on electrical and electronics equipment:



Also, do not forget some other facts:

- RoHS in UK (where it originated from) means 'restriction of hazardous substances', while in India it soon going to mean 'reduction in the use of hazardous substances' (both definitions are poles apart).
- Perfluorocarbons (one of the 6 GHG gases) – used/ produced during aluminium production (one of the main components in IT equipment)
- Sulphur Hexafluoride (one of the 6 GHG gases) – used/ produced in manufacturing of electronics
- Aluminium has a very high embodied energy
- Production of 2 gram 32MB D-RAM memory chip takes 32 kg of water and 1.7 kg of fossil fuels and chemicals
- Manufacture of a PC and Monitor takes 1.8 tons of raw materials and produces 1.4 tons of greenhouse gases
- Several hazardous materials are used in production of IT equipment

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