

# Infrastructure Automation and Analytics

Indispensable tools for the always on business



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## Summary

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Most traditional models manage IT Operations through manpower and static tools. This accounts for the largest expense, approximately more than 40 per cent, in managed services. Effective change, configuration and provisioning are all done through human intervention. As long as organizations are tied up with such linear models they will continue to face operational challenges and administrative overheads. This is primarily because complexity of IT environments is increasing every day but people efficiency are not keeping in pace with the same. Therefore a niche opportunity exists today which establishes a strong case for automation.

This paper establishes the need of next generation automation tools which makes it easy to nurture, sustain and grow IT support infrastructure while maintaining organization's business edge. It discusses a Self-Healing Framework, Which is a suite of next generation automation tools, encompassing Self-healing, Self-service, Predictive Analytics and Machine Learning. The framework promises to shift the paradigm of infrastructure management from remedial services to predictive services.

# Evolution of IT Infrastructure services

Over the last 40 years, the data center has undergone significant changes. Today's IT infrastructure is the outcome of several years of evolution in computing platforms, beginning from the mainframes and mini computers, to personal computers, client servers and the current cloud-based services. The evolution of IT services has developed in a phased manner, as can be seen in Figure 1 below.

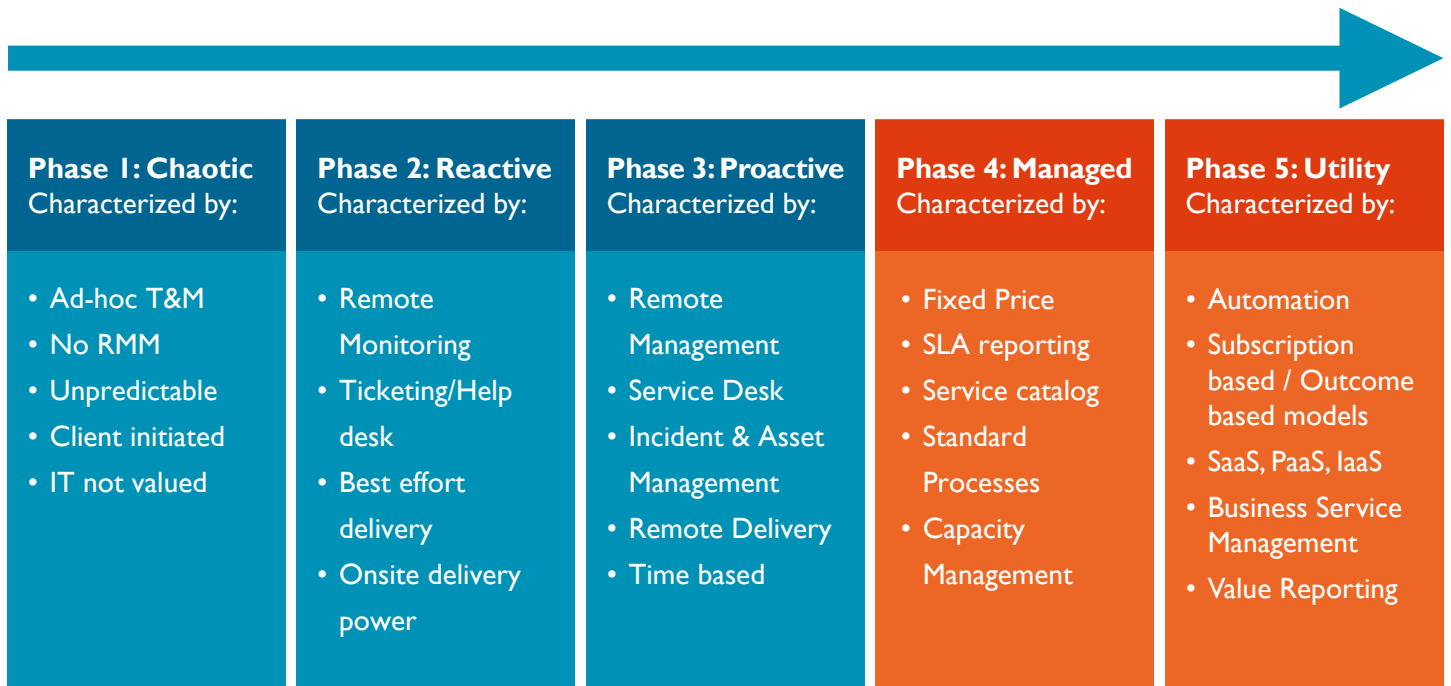


Figure 1: Evolution of IT Infrastructure Services

**Phase 1:** The early years of IT infrastructure were characterised by mainframes and large data centers. Incident management was ad-hoc with users calling the help desk, who in turn opened tickets and routed them to technicians. Incident management was mainly manual and handled by support teams of system administrators.

**Phase 2:** Over time, recognizing that a purely ad-hoc model was expensive in the long run, IT groups developed frameworks and tools to anticipate certain recurring problems and rectify them before they occurred. This model used a combination of self-healing tools and engineers but was still quite reactive, and did not contribute significantly towards identifying issues and solving problems. While there was some automation, the processes were to a large extent still manual and reactive.

## Challenges faced in phases 1 and 2

With the growing demands and a shrinking or static number of IT personnel to service the infrastructure, incident management in phase 2 is in a constant "putting-out-the-fire" mode. In fact, reactive management becomes standard survival strategy. The typical issues faced with reactive management are:

- Engineers do not have to time to determine optimal load balance or energy consumption to arrive at cost savings. This can result in additional costs in the time it takes to discover, react to and resolve a crisis.
- It becomes people-centric instead of process-centric, as it increasingly relies on past methods of resolving issues, resulting in loss of knowledge and continuity when experienced personnel leave.
- In cases where the SLAs are not met, the credibility of IT can suffer, despite the CIO's best efforts.

Phase 3: Proactive management is characterized by performing actions before a situation develops into a crisis, by relying on preventive maintenance to the system. It prevents incidents from occurring, or re-occurring, by identifying weaknesses or errors in the infrastructure and proposing applicable resolutions. It uses tools such as predictive analysis, information integration techniques and machine learning to spot issues early on and fix them before they arise.

## Technology Drivers of Infrastructure Evolution

Moore's law and micro-processing power  
The law of mass digital storage Metcalfe's law and network economics  
Declining communications costs and the Internet  
Standards and network effects

Figure 2: Technology Drivers of Infrastructure Evolution

Proactive incident management relies on both tools and people — system management tools that can monitor the infrastructure and alert a centralized monitoring facility prior to the occurrence of failures, and suitable trained staff to configure and monitor the tools, and with the customer-centric skills to liaise directly with engineers and the end users.

Most traditional incident management models manage IT operations through manpower and static tools. This accounts for the largest expense (42%) in managed services. Effective change, configuration and provisioning are all done through human intervention. As long as customers are tied up to such linear models they keep facing operational challenges and administrative overheads because the complexity of IT environments increases every day but people efficiency is stagnant. The benefits of service-based models are diluted by lack of productivity improvements preventing customers from taking advantage of utility themes.

Phase 4: In a managed services model, whether hosted or remote, the service provider provides a robust set of services for supporting the delivery of business applications and their underlying technologies. This model helps in reducing capital expenses and TCO; in addition, it helps boost organizational productivity, capabilities, and effectiveness, as well as increasing flexibility and scalability.

## The move to a services-based model

Traditionally, companies invested in more capital equipment to meet growing IT needs. However, this led to data centre sprawl, with resulting high costs for storage and energy. Today's challenging economic environment, with additional competitive pressures and growing number of users and applications, has forced IT departments to keep costs down, yet continue to deliver quality of service. Customers are therefore showing keen interest in cloud-centric, on-demand models to circumvent these problems.

Phase 5: As more and more businesses move towards cloud-centric models, traditional models are losing value. There has been a gradual shift of customers from manpower-based support models to consumption-based models such as SaaS, PaaS and IaaS. Customers now care less about technology and more about making IT work on demand, and these models help reduce both costs and risks. Customers therefore expect their IT infrastructure division to provide a service-centric approach with aligned delivery capabilities. Large and mature service providers like Wipro are in Phase 4 and in the process of moving to Phase 5.

However, transitioning to this paradigm can introduce significant change and complexity at a time when data centers are already overburdened and understaffed. In fact, some of the results achieved with the newer models/phases lead to these very challenges — for example, the need for near 100% uptime and quick response to market changes. Without the tools and ability to scale resources to meet the business demands, there will be net loss of productivity as the increased overheads outweighs the efficiency gains provided by the self-service model.

## Challenges in providing IT Infrastructure Services

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Providing IT infrastructure services is becoming increasingly complex, mainly due to growing business demands and advances in technology. Rapidly changing business requirements place complex burdens on the organization's existing IT infrastructure. At the same time, ensuring near-perfect uptime of the IT infrastructure is an imperative, since even brief incidents of downtime can result in large business losses. According to Ponemon Institute<sup>1</sup> study, an outage can cost an organization an average of about \$5,000 per minute. That's \$300,000 in just an hour — not a trivial amount! Among the casualties of the recent Hurricane Sandy were untold numbers of data centers, leading to huge losses — and a sobering understanding of the need for better data center management and disaster recovery.

**The key issues facing the CIO in the management of IT infrastructure are:**

- Inability of existing infrastructure to keep up with increasing demands from business
- Outdated IT processes that are incapable of exploiting new technologies (e.g., cloud computing, virtualization)
- Lack of standardization and consolidation leading to sub-optimized service delivery
- Rapidly evolving I&O strategies are driving new shared services models and requirements

**Today's CIO is grappling with finding suitable answers to the following questions:**

- How can we achieve highest business productivity and availability?
- How can we achieve better alignment between business and technology services?
- How can we achieve process standardization and skill Rationalization?
- How can we reduce high volume L1, L2 efforts?
- How can we virtualize at scale and manage cloud operating models?
- How can we integrate best of breed solutions from different vendors?

A recent Gartner study corroborating this view shows that CIO IT strategies for the near future focus on delivering business solutions while reducing IT costs<sup>2</sup>. Increasing productivity is high on the CIO's

agenda, especially with regard to the traditional models of infrastructure support and maintenance. In addition, traditional productivity improvement methods, such as virtualization, consolidation and remote management, are not always available to the CIO.

## The Future State of IT Infrastructure Services

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To provide the necessary flexibility, reduce the high costs created by IT sprawl and shift resources away from routine maintenance towards innovation and strategic initiatives, the CIO must change the model through which IT infrastructure services are delivered. The new model, Phase 5 in the evolution chain, must

- address the legacy systems and technologies that hinder business growth and flexibility
- lower the total cost of ownership of both hardware and software reduce cost of operations
- allow the enterprise to take advantage of various advancements such as wireless communications, VoIP, RFID, speech recognition, SOA, web services, autonomic computing and grid technologies.

**In short, the fundamental elements of this new model are operational efficiency and a flexible infrastructure.**

Adopting this model requires a shift to an open operating environment where all the component parts are fluid and able to change according to the business conditions. Processes and information must be integrated up and down the supply chain, so that real-time transaction processing, data mining and decision support are possible within and across company lines. Such an on-demand model will result in -

- Highly automated environment for standard and low end activities resulting in reduced demand for low-end labor
- Highly consolidated, virtualized and cloud centric environments resulting in reduced asset and labor spend
- Standardized services driven by IT services catalog requiring clear designs and definitions on how to integrate various products/solutions from different vendors
- End to end integrated IT Service Management for ITIL processes across applications, middleware and infrastructure stacks reducing demand for low end labor
- Vertically tailored SaaS/IaaS integration platform

<sup>1</sup><http://emersonnetworkpower.com/en-US/About/NewsRoom/NewsReleases/Pages/EmersonNetworkPower,PonemonInstituteStudyQuantifiesCostofDataCenterDowntime.aspx>

<sup>2</sup>[http://www.gartner.com/technology/cio/cioagenda\\_findings.jsp](http://www.gartner.com/technology/cio/cioagenda_findings.jsp)

# Automation and Analytics – the Approach of the Future

Automation and Analytics are the key differentiators to help in the evolution from Phase 4 to Phase 5 of Managed Services, to address customer challenges and enable them to reach the future state of IT infrastructure services.

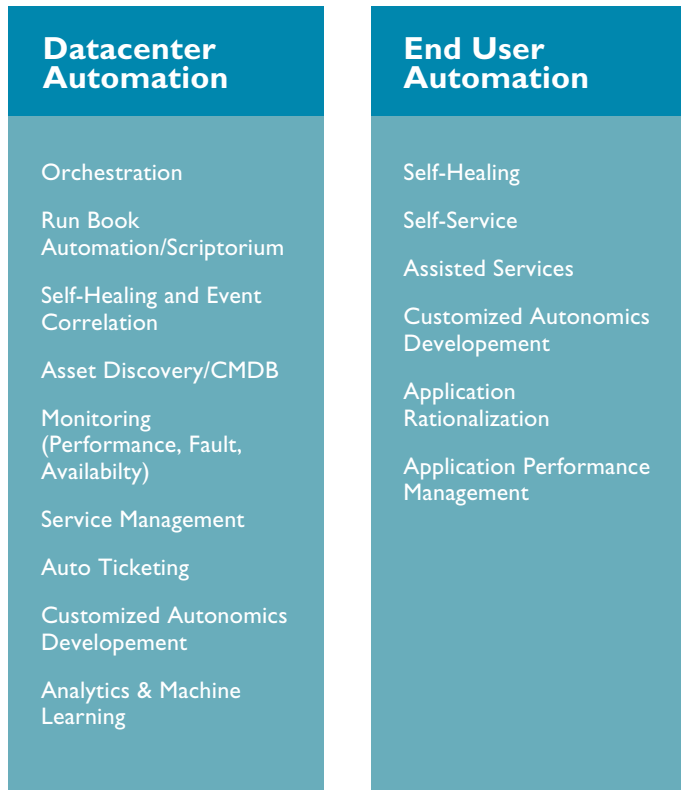


Figure 3: Examples of Datacenter and End-user Automation

Automation allows the critical server and system resources to manage itself flawlessly, completing tasks that once required a human catalyst. It improves operational efficiency and reduces the workload on managers and infrastructure staff. Implementing automatic failure recovery and back up mechanisms can ensure continuous business availability. Importantly, automation can increase operator as well as infrastructure productivity. While 100% automation may not be feasible, a significant amount of automation will reduce the number of resources required, and also free them up for more strategic tasks than fire-fighting.

Analytics allows the data mining of business and operational intelligence garnered from the infrastructure, and the ability to act on that data to provide optimal incident management based on key usage patterns. With the insights gained from analytics, the CIO can actively monitor the IT infrastructure for continual improvement. In fact, analytics can potentially reduce technology infrastructure expenses by up to 40%.<sup>3</sup>

## Conclusion

Today, it is well-known that IT infrastructure is mission-critical to the success of the organization. Yet, increasing demands from business, coupled with stagnant budgets have resulted in constant pressure on the CIO to improve productivity in a cost-effective manner. To increase IT efficiency, agility, and cost savings, the CIO has to ensure the shift from a reactive to an on-demand, services-based model, and use technologies such as automation and analytics to transform the data center into a strategic business asset.

Automated self-healing, self-service and predictive analytics solutions employed will help improve availability, free up resources from performing reactive management tasks and boost productivity. The CIO can thus obtain relief from the challenges of meeting the IT infrastructure objective while maximizing bottom-line results.

<sup>3</sup><http://www.expresscomputeronline.com/sections/tech-views/312-analytics-to-help-better-manage-data-centers>

## About the Author

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Ramkumar Balasubramanian is the General Manager - Practice & Automation, with Managed Services, Global Infrastructure Division in Wipro Infotech Bangalore. As part of his role he is responsible for conceptualization of innovative services and to take these services to the market. Ramkumar has overall experience of 22 years in the industry and has been with Wipro for last 10 years. Prior to his tenure at Wipro Infotech, Ramkumar has worked with HP as a lead architect for the HP Worldwide Catalog Management project based out of the US.

## About Managed Services

Managed Services, a part of the Wipro's Global Infrastructure Services business, has developed a revolutionary automation tool named – "Fixomatic". Fixomatic is a transformational framework powered by our state of the art analytics engine. It employs a Self-Healing Framework that comprises of a suite of next generation automation tools. It combines industry standard solutions on an open source platform with Wipro's Proprietary tools. It is managed through a single pane to support Data Center and End User operations. Our transformational offerings like Self-healing, Self-service, Predictive Analytics and Machine Learning shifts the paradigm of infrastructure management from remedial to predictive services.

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