



Point of View

Cloud Report Card:

Clouding Out Technical Debt

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Introduction

Large IT organizations comprising cross-functional teams, multi-products and services are dedicated to supporting and delivering software solutions on a swift and continuous basis. Such technologies and software solutions are omnipresent and undergo constant change, but the need to keep abreast with this dynamic scenario is highly demanding and can sometimes lead to ambiguity and debts if not monitored from time to time.

Technical debt is considered healthy until it is at reasonable levels. However, if debts aren't administered in time, businesses may face a larger impact in terms of poor or outdated product design, impaired software maintenance, and delays in delivery leading to demotivated teams and dissatisfied stakeholders. With cloud computing gaining momentum, organizations are reaping benefits in terms of lower infrastructure deployment, maintenance costs, agility, scalability, business continuity, and increased utilization.

However, organizations must also look at resolving issues arising from technical debts by leveraging services offered by cloud providers.

According to IDC, by 2023, 75% of G2000 companies would commit to providing technical parity to a workforce that is hybrid by design rather than by circumstance, enabling them to work together separately and in real-time. Through 2023, coping with accumulated technical debt would be the top priority, where CIOs would look for opportunities to design next-generation digital platforms that modernize and rationalize infrastructure and applications while delivering flexible capabilities.

Cloud services have the much-needed capabilities to cater to design, code, and infrastructure components of technical debts that would not just help upgrade and streamline their existing systems, but will also shift focus towards developing and delivering new and innovative products, services, and solutions.

Migrating to the cloud requires a well-coordinated effort between IT operations, infrastructure support, cloud providers, and the organization's senior management. If an organization plans, coordinates, and executes as effectively, then technical debt can be reduced or settled using cloud computing.



What is technical Debt?

Many times, IT teams need to forgo certain development work such as writing clean code, writing concise documentation, or building clean data sources to hit a particular business deadline,” says Scott Ambler, VP and chief scientist of disciplined agile at Project Management Institute.

The additional cost incurred from rework because enterprises couldn’t do it right the first time either due to constraint in time, budgets, or demands, often end up experiencing increased downtime, higher operational costs and cost implied due to additional rework in the long run.

Why Managing Technical Debt is important?

When technical debt is left unchecked, it can limit your organization’s ability to try and adapt to new technologies, restrict organizations from coping with advanced market trends, reduce transparency, and limit timely deliverables.

Studies by CRL have identified that the technical debt of an average-sized application of 300,000 lines of code (LOC) is USD 1,083,000. This represents an average technical debt per LOC of USD 3.61.

With technical and quality debts piling up over a period of time, organizations face a negative impact concerning increased cost and efforts from rework, indefinite delays, and compromise in the brand image or inferior market share.



Some typical use cases

Utilizing less efficient development platforms that unnecessarily increase the length and complexity of code. Studies show that modern platforms can reduce the application development lifecycle by **40-50%**.

Delay in upgrading your IT infrastructure can have a compounding effect as unsupported hardware and software components become more expensive to maintain and operate.

Also, unsupported hardware and software components increase provision time resulting in increased time-to-market. During complex requirements, continuing to work with limited capabilities and resources can increase team fatigue.

Lack of foresight while designing infrastructure can have an impact on future upgrades and change initiatives risking your entire business set-up.



How do we quantify Technical Debt?

- > Quantifying your problems can help you make clear decisions. Breaking it down to numbers not only makes it easier to understand, compare, analyze, and track progress, but also helps create a plan of action to remediate all the detected issues.

Technical debt can be computed with a ratio of the cost incurred to fix the system to the cost it takes to build the system;

Technical Debt Ratio (TDR) = (Remediation Cost / Development Cost) x 100%

TDR is a useful tool that helps track the state of your infrastructure and applications. A low TDR reflects that your application is performing well and doesn't require any upgrades. A high TDR reflects the system is in a poor state of quality and depicts the time required to make the upgrades. Higher the TDR ratio, higher the time it takes to upgrade or restore the application.

Remediation Cost (RC) is the cyclomatic complexity value of a particular project or application. RC can also be represented in terms of time, which will help determine the time taken to fix issues pertaining to a particular code function.

Development cost [DC] is the cost generated from writing the lines of code. For example, the number of lines of code multiplied by the cost per line of code will give us the total development cost incurred to build that code.

Thus, the solution is to represent technical debt as a ratio rather than a hypothetical number. With being represented as a ratio, the stakeholders can quantify the debts objectively and across multiple projects as the calculations contain the number of lines of code, providing an exact best and worst score percentage ratio.

An acceptable thumb rule is that codes with a technical debt ratio of over 10% are considered poor in quality. Once this is determined, the management team is directed towards working along with the development team to define strategies for eliminating the debts.



Types of Technical Debt

Architectural Debt

Architectural debt refer to debts arising out of substandard structural design and implementation that gradually deteriorates the quality of the software.

Build Debt

Large and frequent changes in specifications and codebases lead to build debts.

Code Debt

Large and frequent changes in specifications and codebases lead to build debts.

Defect Debt

Defect debts refer to the bugs or failures found but not fixed in the current release, because there are either other higher priority defects to be fixed or there are limited resources to fix bugs.

Documentation Debt

Documentation debt is a type of technical debt that highlights problems like missing or incomplete information in documents.

People Debt

People debt is debt rising from the resources being less experienced, under skilled and sometimes having to make compromising decisions due to time or budget constraints despite knowing the repercussions of it.

Process Debt

Process Debt is the circumstances in which an organization adopts processes that are easy to implement instead of applying the best overall solution that would be beneficial in the long run.

Requirement Debt

Requirement debt is the debt incurred during the identification, validation, and implementation of requirements.

Service Debt

Service debt is the additional cash that is required to repay the debt for a particular period that includes the outstanding interest, as well as principal components.

Test Automation Debt

The debt arising out of increased effort to maintain a test code because coding standards weren't adopted in the first place.

Infrastructure Debt

IT Infrastructure technical debt is the total cost needed to refurbish technology such as servers, operating systems, anti-virus tools, databases, networks, etc. in order to upgrade them.



Is Cloud the way out?

There are multiple types of debt, each unique but paying them off may or may not be a priority at a given point in time. A decade ago, there were no alternatives to running your infrastructure on data centers, hence solving interoperability issues, or upgrading slower or redundant components efficiently, took a lot of time. Therefore, managing technical debts was a massive challenge for almost all IT organizations.

Organizations have constantly been on the lookout for technical debt reversal strategies and the key possibilities of the cloud's ability to address the various technical debt issues are fast catching up.

A study reveals that organizations end up spending 90% of their time on troubleshooting technical debt issues. The longer you tend to accumulate debts, the longer it takes to resolve it besides incurring higher costs the system sometimes become unfit for daily business operations.

Gartner reports that organizations spend more than 70 % of their IT budget simply operating their technology platforms, as high as 77 % in some industries, thus leaving precious little budget for enhancements and innovation.

Cloud computing has helped unlock an organization's full potential allowing it to move towards innovative capabilities and sustainable growth while performing audits and checks to keep all kinds of debts at bay.

Cloud services enable an organization to:



Move from CapEx to OpEx model



Use pay-as-you-go services



Scale infrastructure



Increase speed and agility of deployments



Auto-scale for better optimization



Reduce maintenance cost



To begin with, it is best to opt for a hybrid cloud approach. Hybrid infrastructure is similar to that of a three-tier architecture, where the application and its data is split between an on-premise and preferred cloud provider that helps optimize costs and gain increased control over the overall architecture.

In many cases, it makes sense for an organization to maintain their customer data on their data centers, while hosting the application on cloud ensuring that their client data is fully secure. This arrangement is cost-effective and enables seamless business operations. In parallel to this, the application takes full advantage of the cloud technology in terms of scaling up or down depending on business needs ascertaining a win-win situation for enterprises. Furthermore, it also offers businesses the flexibility to make changes to the application at any given point in time, as it is essential to keep applications updated and flexible.

Let us look at the three most significant IT debts in today's time and how the cloud acts as a solution to manage and control them.

Infrastructure Debt

Infrastructure must routinely be updated with new software releases to ensure known vulnerabilities are eliminated. When a device and its software are no longer in support, liabilities, as well as disparities, become exceedingly difficult and expensive to mitigate. Cloud helps manage such discrepancies, saves you from having to upgrade and replace your infrastructure periodically and having to regularly manage software patches, scaling, distribution, and resiliency of the platforms supporting your applications and data unless your business requires complete control over the operating system required to run your applications. Lift-and-shift is the fastest and easiest way to cloud-based technical debt solutions, however, to derive maximum benefits from the same, organizations need to sometimes opt for PaaS offerings as well.



Architectural and Design Debt

Cloud can redefine the way software and services are being delivered to your customers with the help of services like,

Containers and microservices

Containers and microservices are the keys to driving innovation within organizations, especially if you have numerous customer-facing applications and services. The microservice architecture enables hassle-free and continuous software delivery with increased business agility. Containers are a repository that holds your applications, configurations, and OS dependencies in one lightweight bundle that's easier to deploy and faster to provision. Containers help organizations to efficiently manage their applications with automated techniques. Additionally, the core of container services is open-sourced, thus also enabling you to keep your budgets in check.

DNS

DNS or domain name system is often not given enough weightage, but they play a huge role in aggregating multiple technologies, enabling quick response times and making sure everything runs smoothly all around your infrastructure.

Cloud technologies demand high API call rates, tasks like auto-scaling, spinning up new instances, and traffic automation for optimization. The traditional DNS servers might not be capable of supporting its fast-paced infrastructure. So, teams must ensure that the necessary infrastructure requirements are met by these DNS platforms to ensure smoother operations.



Process Debt

Often, overheads in terms of technical and architectural analysis, code reviews, testing, and release management processes are not taken much into account, and these can lead to significant problems in any business environment. These factors can trap organizations in a legacy cycle and restrict them from implementing new processes.

With cloud solutions, management teams are able to identify what suits them best as per their needs, while also comprehending how new remediation processes should be accurately introduced and followed by development teams.

Clear visibility of your IT infrastructure usage patterns would mean that policies are in place, which in turn, would ensure consistency in monitoring, logging, and tracing activities, along with streamlining the performance metrics and process telemetry.

Services like IAC (Infrastructure-as-Code) and configuration management tools help completely automate processes and minimize bottlenecks in your code delivery empowering engineers to focus on delivering business value.

Conclusion

As per studies, over 95% of organizations plan to increase their cloud spends by the end of 2021, as the need for matured cloud platforms and technologies have become vital. There has been a significant surge in the demand for cloud even if the initial cloud set-up costs seem high and unwarranted.

Organizations are beginning to understand that initial investment in cloud infrastructure and services, costs incurred from acquiring data center management tools, as well as from hiring cloud-specialized resources apart from support and maintenance costs are worthwhile as the benefits derived from it are everlasting.

Despite the heavy investments at the beginning, setting up a cloud environment is still considered the best trade-off and the most economical option of all. This is mainly because it drastically cuts down on daily operational expenses, keeps the systems up-to-date thus improving the uptime and efficiency of business while minimizing technical debts.

Advancements in the cloud space will always be an ongoing process that would call for continuous optimization of systems to enable organizations to progress towards innovation and modernization.



About the Author



Kiran Kumar

Business Analyst, LTI

Kiran is an proficient and creative marketer with a proven skill in marketing cloud products and services. He has worked with cloud hyperscaler's like AWS, and GCP to develop and execute large integrated marketing campaigns from end-to-end to position LTI as a leader in the cloud consulting space.

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info@Ltinfotech.com



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