OSPOlogy

TODO

CLOUD NATIVE COMPUTING FOUNDATION

OSPOlogy BoF Report

India 2024

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About This Report

This report aims to identify and address challenges faced by organizations to manage open source and foster cloud-native adoption in India, providing recommendations.

METHODOLOGY

A mixed-methods approach was employed to ensure a holistic view of the issues and identify recommendations:

- **Interactive Group Activity:** An in-person Birds of a Feather (BoF) session was conducted during the OSPOlogy event at KubeCon + CloudNativeCon India 2024 in New Delhi. Approximately 30 participants, including security teams, cloud engineers, open source managers, and community leaders, engaged in discussions to identify and prioritize challenges specific to the Indian market.
- **Asynchronous Collaboration:** Following the BoF session, participants continued to collaborate asynchronously to develop recommendations and cross-reference existing work. Participants of the BoF who expressed interest are acknowledged as co-authors.

Background

India's market in 2024 is marked by a strong inclination towards digital transformation. The Indian technology industry's revenue, including hardware, is projected to surpass **US$254 billion in FY2024,** reflecting a 3.8% year-on-year growth. This growth is fueled by the increasing adoption of open source and cloud-native technologies, which are pivotal in driving innovation, agility, and cost efficiency. This trend is more remarkable in the following areas:

CLOUD EXPANSION AND ADOPTION OF CLOUD-NATIVE ARCHITECTURES

The Indian cloud market is witnessing unprecedented growth, with projections indicating a 24% increase in adoption across various sectors, including government, healthcare, retail, supply chain, logistics, manufacturing, and financial services. This surge is attributed to the flexibility, scalability, and cost-effectiveness of cloud-native solutions, enabling organizations to innovate rapidly and respond swiftly to market demands.

Source: https://www.forrester.com/blogs/cloud-explosion-propelling-indias-digital-growth-story/

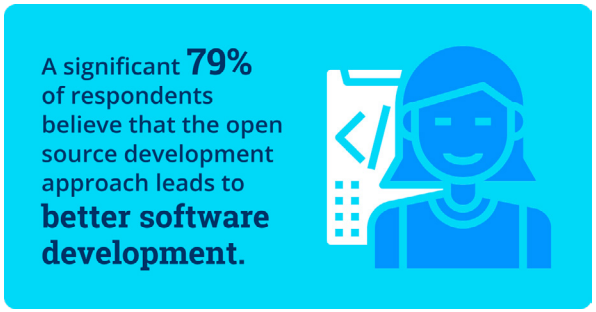
Digital Native Businesses in India are increasingly adopting cloud-native modular architectures built around microservices. This approach allows independent operation and communication through APIs, enabling rapid scaling and meeting rising customer digitalization demands. The estimated growth rate for tech spending on cloud-based solutions is 37%, surpassing non-cloud software and IT services.

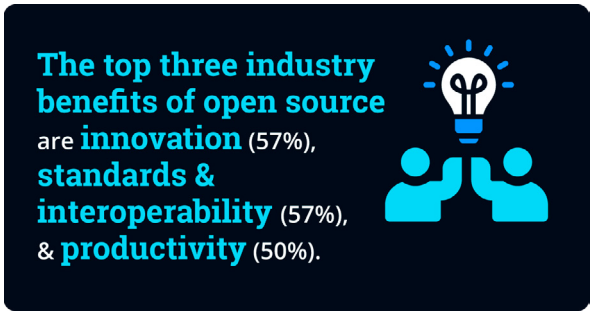
Source: https://www.akamai.com/site/en/documents/research-paper/2024/asia-digital-native-businesses-report-india.pdf

OPEN SOURCE SOFTWARE ADOPTION

Global Adoption and Perceived Benefits

According to the 2024 Global Spotlight Insights Report by the Linux Foundation, 79% of respondents affirm that the open source development approach leads to greater software quality. The perceived industry benefits reported in driving OSS adoption are Innovation, Standards and Interoperability and Productivity.





Regional Insights

The 2024 Global Spotlight Insights Report indicates that a significant percentage of organizations in North America and Europe openly encourage both the use and contribution to open source projects. Despite the widespread usage adoption, contributors often face challenges such as time constraints (63% identify lack of time) and funding limitations (34% identify insufficient funding) from their organizations and governments. In light of this, a notable proportion of organizations have established Open Source Program Offices (OSPOs) or have clear and visible strategies to support OSS initiatives.

On the other hand, in the Asia-Pacific region, the engagement with OSS is slightly lower compared to North America and Europe. However, the report highlights a positive trend, with increasing numbers of organizations adopting OSS principles and encouraging contributions.

India's Ascending Role in the OSS Ecosystem

Within this global context, India has emerged as a significant player in the OSS landscape. The country has witnessed a substantial increase in both adoption and contribution to open source technologies. As of 2024, India hosts over 17 million developers on GitHub, marking a 28% year-over-year growth. Projections indicate that by 2028, India will surpass the United States to become the largest developer community on GitHub.

Source: https://github.blog/news-insights/octoverse/octoverse-2024/

GOVERNMENT INITIATIVES AND INVESTMENTS

The Indian government's commitment to digital transformation is evident through substantial investments in cloud infrastructure and artificial intelligence (AI). In 2024, the Indian government has intensified its focus on cloud-native technologies through the Open Cloud Compute (OCC) Initiative. This initiative aims to create an open and interoperable marketplace for cloud providers of all sizes, challenging the dominance of major global players. By utilizing open protocols and standards, the OCC seeks to provide cost-effective and flexible cloud solutions, fostering

innovation and reducing dependency on foreign providers.

Moreover, the Ministry of Electronics and Information Technology (MeitY) introduced the "Policy on Adoption of Open Source Software for Government of India," mandating that all government software applications and services be built using Open Source Software (OSS). However, implementing this policy has been challenging. There have been instances where government agencies have issued tenders for proprietary software, even when OSS alternatives are available. For example, in 2024, the National Highways Authority of India (NHAI) floated a tender to procure proprietary products.

The government had announced plans to unveil a new national IT policy by the end of 2024, aiming to update the previous 2012 policy with a stronger focus on creating and exporting IT products and services. However, as of now, the policy has not been released, and there have been no official updates on whether it is still in progress.

Source: https://spectrum.ieee.org/cloud-computing-in-india

https://dig.watch/updates/indian-government-to-unveil-new-national-it-policy-by-end-of-2024

https://www.meity.gov.in/writereaddata/files/policy_on_adoption_of_oss.pdf

Discovered Challenges in the India Market

As India's digital market continues to embrace open source and cloud-native technologies, several challenges have emerged that require strategic attention. These challenges can be categorized into the following key areas:

SECURITY

The vast number of downloads and integrations increase the attack surface, making it imperative to address vulnerabilities promptly. The 2024 State of the Software Supply Chain report highlights the unprecedented challenges posed by this rapid expansion, emphasizing the need for comprehensive security measures.

Source: https://www.sonatype.com/blog/the-scale-of-open-source-growth-challenges-and-key-insights

COLLABORATION - FROM CONSUMERS TO CORE CONTRIBUTORS AND LEADERS

According to GitHub's Octoverse 2024 report, India has over 17 million developers building on GitHub, marking a 28% year-over-year growth. This positions India as the fastest-growing developer community globally. While, India boasts a substantial open source developer community, transitioning from consumers to active contributors and leaders remains a challenge.

Source: https://www.crn.in/news/over-17m-developers-now-building-on-github-in-india-fastest-growing-developer-community-in-the-world/

STARTING AND STRUCTURING OPEN SOURCE MANAGEMENT UNITS

Establishing and structuring dedicated Open Source Management Units has become essential for organizations to effectively navigate the complexities of their open source engagements. The establishment of Open Source Program Offices (OSPOs) has become a chosen pattern for establishing Open Source Management Units adopted by numerous organizations.

The 2024 State of OSPOs and Open Source Management report highlights how the establishment of OSPOs showed effective integration from a growing number of organizations of open source management in two key specializations: security and AI infrastructure. Notably, 91% of OSPOs are involved in managing security issues, and 84% are engaged in overseeing Generative AI (GenAI) infrastructure. Additionally, 80% of organizations report that their OSPOs have a meaningful impact on their ability to collaborate with open source communities.

Source: https://todogroup.org/blog/state-of-ospo-2024/

MANAGING OSS BEST PRACTICES

As open source adoption rises, organizations face the challenge of standardizing best practices. The 2024 State of Open Source Report sheds light on the factors driving OSS adoption and the difficulties teams encounter, underscoring the importance of establishing clear guidelines and practices.

Source: https://opensource.org/blog/announcing-the-2024-state-of-open-source-report

PRODUCT ROADMAP / ENGINEERING

Aligning product roadmaps with open source strategies remains a challenge. Indian organizations often grapple with the decision to contribute to existing open source projects (upstream development) or to fork and develop independent versions.

Source: https://takshashila.org.in/research/an-open-tech-strategy-for-india

Recommendations

To ensure that India's enterprises foster innovation, agility, and cost-efficiency in the digital market and effectively navigate the complexities of open source and cloud-native technologies the following targeted recommendations are proposed. Please note the recommendations are designed to address the "How might we" questions identified by the community during the OSPOlogy BoF.

The BoF session identified and prioritized the following topic clusters, focusing on challenges specific to the Indian market.

Topic Challenges	"How might we" Questions
Security	• How might we address critical update event vulnerabilities in Open Source projects?
Collaboration and Engagements	• How might we overcome networking issues that hinder productivity and collaboration? • How might we enhance the process for sharing ideas effectively?
Starting and Structuring OSPOs	• How might we structure the OSPO in the most efficient way? • How might we launch an OSPO with the right guidance and support?
Managing OSS Best Practices	• How might we standardize Open Source best practices in our company, including how employees engage with OSS projects and communities? • How might we increase traction toward incubating projects like Kubernetes? • How might we address security concerns, product bugs, and support requirements in OSS projects while balancing cost savings and losses? • How might we encourage companies to contribute more to Open Source?
Product Roadmap/Engineering	• How might we navigate the challenges of moving away from upstream development, and why do we choose to fork? • How might we enable developers to contribute effectively to Open Source? • How might we align different expectations from Open Source projects to avoid major bottlenecks? • How might we use a product roadmap to build an Open Source ecosystem and demonstrate returns on investment?

SECURITY

How might we address critical update event vulnerabilities in Open Source projects?

IMPLEMENT SECURITY MEASURES AS PER CERT-IN ADVISORY CIAD-2023-0036

The Indian Computer Emergency Response Team (CERT-In) provides measures to prevent web intrusion attacks, Denial of Service attacks, and malware attacks. Key recommendations include:

- **Apply Appropriate Updates and Patches:** Regularly update software to fix known vulnerabilities.
- **Conduct Security Audits:** Perform regular security assessments to identify and mitigate potential risks.
- **Deploy Web Application Firewalls (WAF):** Implement WAFs to filter and monitor HTTP traffic between a web application and the internet.
- **Use Security Information and Event Management (SIEM) Solutions:** Use SIEM tools to collect, analyze, and respond to security events in real-time.

Source: https://sansad.in/getFile/loksabhaquestions/annex/183/AU3822_z3M2Nh.pdf?source=pqals

FOLLOW THE OPENSSF CONCISE GUIDE FOR DEVELOPING MORE SECURE SOFTWARE

The Open Source Security Foundation (OpenSSF) offers a concise guide with actionable recommendations for secure software development:

- **Evaluate Software Dependencies:** Assess software before selecting it as a dependency to avoid introducing vulnerabilities.
- **Implement Automated Testing:** Incorporate automated tests, including negative tests, to ensure software behaves as expected under various conditions.
- **Monitor Dependencies for Vulnerabilities:** Regularly check for known vulnerabilities in both direct and indirect dependencies and update them promptly.
- **Establish a Security Policy:** Create a clear security policy and provide contacts for reporting vulnerabilities.

Source: https://best.openssf.org/Concise-Guide-for-Developing-More-Secure-Software.html

COLLABORATION AND ENGAGEMENTS

How might we overcome networking issues that hinder productivity and collaboration?

ADOPT INNERSOURCE PRACTICES

Implement open source methodologies internally to foster collaboration across different departments. This approach, known as InnerSource, encourages the use of open source development best practices and culture within an organization, enhancing communication and reducing silos. The InnerSource Commons Foundation has developed a set of patterns to help organizations get started.

PROMOTE A CULTURE OF OPEN COLLABORATION

Encourage a culture where employees feel empowered to contribute to projects beyond their immediate responsibilities. For instance:

- Implement recognition programs that acknowledge employees who take on additional responsibilities or propose innovative solutions

- Support employees in pursuing learning opportunities that extend beyond their current job functions
- Create initiatives that reward employees for achieving specific goals or milestones, encouraging them to take ownership
- Create opportunities for employees to work with different teams

How might we enhance the process of sharing ideas effectively?

ENCOURAGE INNERSOURCE PRACTICES

Adopt open source methodologies internally, enabling employees to collaborate across departments on shared projects. InnerSource is a proven practice adopted by several organizations for the establishment of an open source-like culture within organizations. InnerSourcePatterns by InnerSourceCommons.org shares a set of patterns to help navigate organizations in open source internal culture.

STARTING AND STRUCTURING OSPOS

How might we structure the OSPO in the most efficient way? How might we launch an OSPO with the right guidance and support?

ASSESS ORGANIZATIONAL OBJECTIVES

Begin by evaluating your company's overarching goals and strategic vision.

- Ensure that the OSPO's goals are in sync with the broader business strategy, facilitating support from leadership and integration with other departments
- Set up expectations to Executives and c-level managers upfront and customize OSPO strategy to implement open source in your organization based on the nature of the organization

FOSTER AN OPEN SOURCE CULTURE

Promote open source best practices internally, encouraging collaboration and transparency to enhance innovation and employee engagement. Some organizations includes this as part of their InnerSource strategy.

DEFINE CLEAR ROLES AND RESPONSIBILITIES

Establish specific roles within the OSPO to manage various aspects like compliance, community engagement, and internal advocacy.

ENGAGE WITH EXTERNAL COMMUNITIES

Actively participate in external open source communities to stay informed about trends, contribute to projects, and enhance the organization's reputation.

MANAGING OSS BEST PRACTICES

How might we standardize Open Source best practices in our company, including how employees engage with OSS projects and communities?

TREAT OPEN SOURCE PROJECTS AS PRODUCTS

Prioritize timely bug fixes and feature implementations to maintain high-quality open source offerings. This approach ensures that your projects remain reliable and valuable to users.

DEVELOP DOCUMENTATION

Create detailed README files, contributing guidelines, and codes of conduct for your public repositories. Clear documentation facilitates external contributions and promotes adherence to community standards.

ESTABLISH AN OPEN SOURCE PROGRAM OFFICE (OSPO)

Form an OSPO to oversee open source integration across business units and education, ensuring compliance with licensing, fostering community engagement, and aligning projects with organizational objectives.

ENCOURAGE EMPLOYEE PARTICIPATION IN OPEN SOURCE COMMUNITIES

Empower employees to engage with open source projects by allocating time and resources for contributions. Participation in external communities enhances skills, fosters innovation, and strengthens the company's reputation in the open source ecosystem.

How might we increase traction toward incubating projects like Kubernetes?

DEVELOP A ROADMAP

This roadmap should align with an organization's business objectives, whether it *sells* software (e.g SaaS, Enterprise Software, Cloud Providers) or *relies on software* (e.g., Retail, Manufacturing, Banking, Healthcare). The open source strategy will differ based on these business models, the roadmap should be adapted for different contexts. For example:

- **For Software Vendors:** The roadmap could integrate open source as part of the business model.
- **For Enterprises Using OSS:** The roadmap could focus on reducing operational risks, improving software supply chain security, and ensuring long-term sustainability.
- **For Government & Public Sector:** Open source adoption could align with digital sovereignty goals and transparency

ENGAGE THE COMMUNITY

Actively involve the developer community through regular updates, discussions, and opportunities for contribution.

ENSURE MODULAR ARCHITECTURE

Design the project with a modular architecture to allow independent components to be developed and tested concurrently. This flexibility enables easier collaboration and integration of new features.

PROVIDE DOCUMENTATION

Detailed guides, tutorials, and API references to lower the barrier to entry for new contributors and users.

How might we encourage companies to contribute more to Open Source?

ACKNOWLEDGING THEIR SUBSTANTIAL RELIANCE ON IT

Studies indicate that open source components comprise up to 90% of modern software applications. This widespread dependence underscores the critical role open source plays in today's technology landscape.

HAVE YOUR ORGANIZATION PUBLICLY HIGHLIGHT ITS USE OF OPEN SOURCE BY LISTING ITS TECHNOLOGY STACKS

This can be as simple as listing down the technology stack used by a company. See **https://zerodha.tech/stack** for reference.

ENCOURAGE YOUR COMPANY TO CONTRIBUTE BACK

Either through code contributions or financial support. Initiatives like the **Open Source Pledge** serve as effective means to hold companies accountable for their participation in the open source ecosystem.

PRODUCT ROADMAP/ENGINEERING

How might we navigate the challenges of moving away from upstream development, and why do we choose to fork?

We choose a fork when the upstream development has stopped or chosen a way that goes against the direction of the vision and project.

The challenges faced would be keeping up with the upstream and have conflicts in the fork which may break the code, working with very different vision which can hamper the progress if not thought well etc.

How might we enable developers to contribute effectively to Open Source?

Assess the Need of Forking: Forking a project transfers full responsibility for development, security updates, and bug fixes to your organization. This demands substantial resources, including dedicated personnel and infrastructure. Before opting to fork, engage with the original project's community to address concerns collaboratively, which is often more resource-efficient and fosters a healthier ecosystem.

Diagnose Common Scenarios Prompting Forks: A common scenario prompting consideration of a fork is the stagnation or inactivity of the original project. Before opting to fork, it's essential to delve into the root causes of this inactivity and explore revitalization strategies. Projects may become unmaintained due to factors such as maintainer burnout, resource limitations, or difficulties in attracting new contributors.

Projects like The Community Health Analytics in Open Source Software (CHAOSS) can help identify issues like declining contributor activity or reduced responsiveness, providing a data-driven foundation for decision-making. This project offers guides, metrics and models to assess open source community health.

Explore Revitalization Strategies: Organizations can provide the necessary assistance to overburdened maintainers through funding or sharing maintenance responsibilities. They can also contribute with infrastructure, tools, or financial support to the project.

How might we align different expectations from Open Source projects to avoid major bottlenecks?

Beyond establishing clear governance models, regular communication, and documenting project scope on a project level, it's essential to embrace the following principles within the organization's stakeholders and business teams:

Recognize Open Source Contribution as Strategic Investment: While open source contributions may not directly generate profits, they play a crucial role in supporting product lines and team units to achieve their financial objectives.

The traditional notion of "giving back" to the open source community has faced criticism. Some industry leaders argue that framing contributions as mere philanthropy can lead to their devaluation, especially during economic downturns when such initiatives are often the first to face budget cuts.

This perspective suggests that viewing open source engagement solely as altruism undermines its strategic importance, but the real-world incidents have demonstrated the adverse effects of reducing open source contributions. For instance, the Log4Shell vulnerability in 2021 exposed critical weaknesses in widely used open source software. This incident highlighted how decreased support and maintenance can lead to significant security risks, as unmaintained projects become susceptible to exploitation. Organizations relying on these projects faced increased vulnerabilities,

underscoring the necessity of sustained contributions to ensure robustness and security.

Thus, an alternative approach adopted by some organizations is to view open source contributions through the lens of security and risk management. By actively participating in and supporting open source projects, companies can exercise greater oversight and influence over the software components they integrate into their products and services. This proactive involvement not only mitigates potential vulnerabilities but also fosters a culture of shared responsibility and collaboration, ultimately enhancing the resilience of the software supply chain.

Foster Cross-Company and Industry Collaboration:
Working together on shared projects leads to superior solutions and innovations that benefit the entire industry. There are notable examples already across industries. For instance CNCF fosters collaboration among industry leaders to advance container technology and align the tech industry around its evolution. Notable contributing companies include Amazon, Google, Red Hat, Intel and more.

Automotive Grade Linux (AGL) unites various stakeholders to create a de facto industry standard for infotainment, telematics, and instrument cluster applications. Notable contributing companies include Toyota, Nissan, Volvo or Hyundai.

LF Energy unites a diverse group of stakeholders like Shell, Alliander, RTE, Hydro-Québec or GE Renewable Energy to collaboratively develop solutions for the energy sector's digital transformation.

Bibliography

“How to Create an Open Source Program Office” - TODO Group
https://todogroup.org/resources/guides/how-to-create-an-open-source-program-office/

“Key Challenges for Managing an OSPO in the Enterprise”- The Linux Foundation
https://www.linuxfoundation.org/blog/key-challenges-for-managing-an-ospo-in-the-enterprise

“Creating an Open Source Program Office (OSPO)” - FINOS
https://osr.finos.org/docs/bok/activities/level-2/creating-an-ospo

“The 2024 State of OSPOs and Open Source Management” - The Linux Foundation
https://www.linuxfoundation.org/research/ospo-2024

“An Open Tech Strategy for India”
https://takshashila.org.in/research/an-open-tech-strategy-for-india

“Over 17M Developers Now Building on GitHub in India, Fastest Growing Developer Community in the World”
https://www.crn.in/news/over-17m-developers-now-building-on-github-in-india-fastest-growing-developer-community-in-the-world/

“Indian Government to Unveil New National IT Policy by End of 2024”
https://dig.watch/updates/indian-government-to-unveil-new-national-it-policy-by-end-of-2024

“Cloud Computing in India”
https://spectrum.ieee.org/cloud-computing-in-india

“Asia Digital Native Businesses Report: India”
https://www.akamai.com/site/en/documents/research-paper/2024/asia-digital-native-businesses-report-india.pdf

“Cloud Explosion: Propelling India’s Digital Growth Story”
https://www.forrester.com/blogs/cloud-explosion-propelling-indias-digital-growth-story/

About OSPOlogy BoF

OSPOlogy (BoF) Birds of a Feather is a framework consisting of semi-informal discussion sessions held at conferences, where participants with shared interests come together to discuss open source management and OSPO challenges and its strategic value in security, innovation, and collaboration within different industries, specializations or technologies.

Conference Organizers are welcome to use the OSPOlogy BoF template and adapt this framework to their specific needs, provided proper attribution is given under the CC BY 4.0 license.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