

VRITTI

MAY 2025





Dear Readers,

This edition of our newsletter arrives at a pivotal moment. As Rajesh eloquently outlines in "AI's New Frontier," we stand on the cusp of an era fundamentally reshaped by Artificial Intelligence. The speed and scale of this transformation are indeed "mind-boggling," with projections of corporate AI spending reaching staggering heights. Yet, as Rajesh astutely points out, this rapid advancement presents both immense opportunities and profound challenges, particularly concerning the potential for widening global inequalities. His insights offer crucial lessons for navigating this transition, emphasizing efficiency, the power of open-source, ROI-driven adoption, talent development, and a human-centered approach to AI integration.

Building on this theme, Satyajit's article on "The need to have a neutral Payment Orchestration Layer" delves into the practical implications of this technological shift within the digital commerce landscape.

In a market like India, where transaction success rates present a significant hurdle, the need for a streamlined and unbiased payment process is paramount. Satyajit compellingly argues for the adoption of neutral orchestration layers, like our own *mobiquity*®. One, highlighting their ability to enhance flexibility, improve success rates, optimize costs, and ultimately elevate the customer experience. The impressive results achieved with India's leading gifting platform underscore the tangible benefits of this approach.

Finally, Deepanshu's piece, "Strengthening Security with Client-Centric Solutions," addresses a foundational concern in this evolving digital world: security. He details the significant enhancements made to our PreTUPS™ framework, emphasizing a client-centric approach that offers unparalleled configurability. Features like nonce implementation, signatures, and end-to-end encryption empower our partners to tailor their security strategies, ensuring resilience in an increasingly complex threat environment.

Together, these articles paint a comprehensive picture of the dynamic interplay between AI, embedded payments, and the future of our digital world. As leaders, innovators, and partners, it is our collective responsibility to navigate this transformative era with foresight, ethical considerations, and a steadfast commitment to creating a more prosperous and equitable future for all.

I hope you enjoy reading these articles as much as we did while putting them together for you.

Srinivas Nidugondi

Chief Operating Officer, Digital Financial Solutions

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AI's New Frontier

Navigating a World Transformed
Challenges, Opportunities, and the Spectre of Inequality

— BY RAJESH FONDEKAR





Rajesh Fondekar With over 25 years of experience in Payments, digital channels and Transaction Banking, Rajesh has a proven track record of successfully managing digital business and driving transformation. He holds a deep understanding of the Retail as well as corporate digital channels, Transaction Banking and the evolving digital payments landscape. His expertise span across various domains, including retail banking, corporate banking, and trade finance. He is passionate about delivering exceptional digital experiences to customers and driving business growth through innovative solutions. Rajesh possesses strong leadership and interpersonal skills, enabling him to effectively collaborate with cross-functional teams and drive successful project outcomes.

The world is being propelled into a new era driven by the rapid advancements in Artificial Intelligence. Imagine a world where several AI competing models are as efficient as DeepSeek in terms of significantly reduced computational demands and deliver comparable results. This is no longer a far-off aspiration but an occurring reality as we read and it is poised to reshape destinies of nations, disrupt industries, redefine global competitiveness and potentially exacerbate existing inequalities.

The AI revolution unfolds across a global spectrum with tech giants in developed nations pouring massive investments into cutting-edge research, to ingenious innovators in resource-constrained environments crafting novel solutions. The new AI led era will unveil unprecedented opportunities, but it is also fraught with profound challenges that demand attention.

The scale and speed of this transformation is mind-boggling and perhaps is unprecedented. Media reports indicate that corporate AI, tech giants like Alphabet, Amazon, Apple, Meta, Microsoft, Nvidia etc are slated to spend an estimated \$325 billion in 2025 alone! This means that the investment in AI in leading economies now rivals the research and development budgets of entire nations, underscoring a tilt towards private sector driven innovation.

To balance, recent news of Microsoft cancelling data centre leases amid oversupply concerns suggests that this frenzied investment may not be translating into immediate returns and may raise questions about the sustainability of the current AI boom. Yet the question remains: how can nations across the economic spectrum effectively harness this accelerating momentum while simultaneously mitigating the inherent risks and ensuring an equitable distribution of benefits?

Key Lessons for a World in Transition

Efficiency as a Global Imperative

The emergence of more efficient AI models underscores a critical and eternal lesson: innovation doesn't always necessitate vast resources. This is especially pertinent for developing and underdeveloped economies, where resource constraints often present a significant barrier to entry. Prioritizing model efficiency – through optimized architectures, techniques like quantization and the adoption of open-source tools – can enable these

nations to participate meaningfully in the AI revolution without requiring infrastructure mirroring that of wealthier nations. This is especially relevant given comments made by Satya Nadella suggesting that AI has not provided real value yet. This calls into question whether there is enough demand for all the increased infrastructure and computing resources.

Open Source: A Catalyst for Localized Innovation

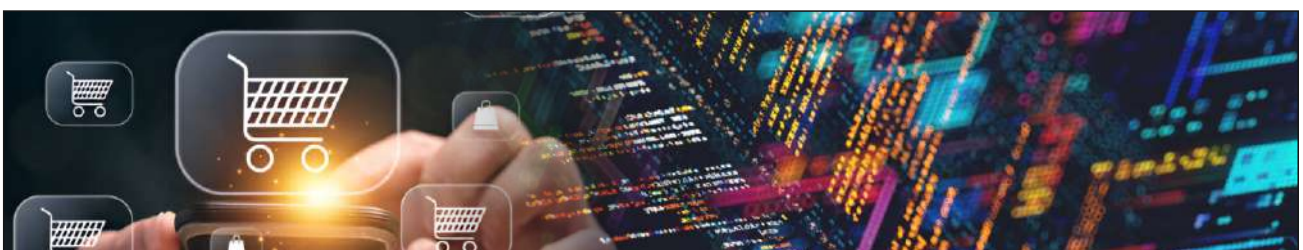
The open-source AI movement democratizes access to cutting-edge technologies, offering opportunities for customizing the solutions to local needs. Developing economies can leverage open-source platforms to build AI-driven systems addressing specific challenges within their unique socio-economic contexts.

This might include AI tools for precision agriculture that optimize resource use in regions facing water scarcity, or AI-powered diagnostic tools that improve healthcare access in areas with limited medical infrastructure.

ROI-Driven Adoption: A Universal Principle

The allure of AI can be powerful, compounded by all pervasive fear of missing the boat, it is critical that all nations must prioritize applications with clear, measurable returns on investment. While developed economies may have an appetite for failures, under-privileged economies will have to be mindful of the economic and social returns. Whether it's automating government services to improve efficiency in developed economies

or deploying AI-powered educational tools to enhance learning outcomes in developing nations, the focus must be on tangible benefits. In the realm of financial services, this could mean AI driving financial inclusion by enabling micro-lending, streamlining access to insurance, and providing tailored financial advice to previously excluded populations. Well calibrated investments can transform and accelerate the march towards development.



Talent Development: Bridging the Skills Gap

Human ingenuity is irreplaceable; however, the right use of AI can dramatically amplify it. It is going to get essential for all nations to invest in education and training programs that develop a skilled workforce capable of understanding, implementing, and overseeing AI systems. This includes promoting STEM education, providing reskilling opportunities

for workers in industries undergoing AI-driven transformation, and fostering a culture of lifelong learning. A key cultural shift which will have to be driven is to inculcate the custom of continuous adaptation, as the skills required to effectively work with AI are constantly evolving.

Augmentation, Not Replacement: A Human-centered Approach

The future of work in the age of AI requires a delicate balancing act. Rather than focusing solely on automation, nations must embrace a human-centric approach that prioritizes augmentation – using AI to enhance human capabilities and improve well-being. Some recent academic researchers have begun to emphasise on a critical shift in perspective:

moving beyond what AI can do to consider what it should do. While the innovators can focus on what AI can do, the adopters should focus on what it should do, considering the complexity of tasks, frequency of repetition, fragmentation costs, and the potential cost of failure.

Addressing the Inequality Challenge

AI undoubtedly has the potential to exacerbate existing inequalities, both within and between nations. Developed economies, with their vast resources, advanced infrastructure, and skilled workforces, may be better positioned to capture the economic benefits of AI. This can potentially widen the gap with developing and underdeveloped nations. It is important that the AI capabilities are made available to

underprivileged economies as they have a real need for such technologies. For these nations AI-enabled services can be a key capability to reduce inequality. For example. Using AI in financial inclusion efforts can accelerate social good, by increasing access to credit, insurance, and other financial products, AI can empower underserved communities, promote economic development, and reduce poverty.

The Importance of Ethical Frameworks

As AI becomes more integrated into our lives, ethical considerations can't be over-looked. All countries must work together to develop global ethical frameworks that ensure AI systems are fair, transparent, and accountable. This includes addressing issues such as bias in algorithms, accountability, traceability,

interrogability of data models, data privacy and the mitigations for potential job displacement. In the context of consumer credit, ensuring algorithmic fairness is critical to preventing discriminatory lending practices and promoting equitable access to financial opportunities.

Navigating the Nuances: Differential Impacts and Strategies

The impact of AI will vary significantly depending on a nation's economic status and specific circumstances.

Developed Economies

These nations often face challenges related to workforce transition, ethical considerations, and the need to maintain a competitive edge in the global AI race. Strategies for success include investing in research and development, fostering innovation through public-private partnerships, and developing robust regulatory frameworks. Furthermore, it is pivotal to proactively address the potential for AI to widen income inequality.

Developing Economies

Developing Economies: These nations may face challenges related to infra-structure limitations, skills gaps, and access to capital. Strategies for success include focusing on AI applications that address pressing social and economic needs, such as financial inclusion and improved access to healthcare, leveraging open-source technologies, and promoting international collaboration to access expertise and resources. pivotal to proactively address the potential for AI to widen income inequality.

Underdeveloped Economies

These nations often face the most significant challenges, including limited access to technology, education, and healthcare. AI can play a transformative role in these contexts, and it must be implemented in a way that is sustainable, culturally appropriate, and aligned with local priorities.

A Call to Action

The AI revolution is upon us, and its impact will be felt across the globe. By embracing innovation, prioritizing ethical considerations, fostering international cooperation, and recognizing the potential for AI-enabled financial services to drive social and economic progress, nations can harness the transformative power of AI to create a more prosperous and equitable future for all. The key lies in recognizing the unique challenges and opportunities facing each nation and tailoring strategies accordingly. Only through a concerted global effort can we ensure that AI benefits all of humanity, and, crucially, does not exacerbate existing inequalities. This requires a conscious and deliberate effort to design and deploy AI systems that are inclusive, fair, and accessible to all. The alternative is a future where the benefits of AI are concentrated in the hands of a few, while the vast majority are left behind.

6 ways to make your

User Experience More Seamless

— BY BINDESH PANDEY





Bindesh Pandey is a visionary in the world of fintech, boasting nearly two decades of invaluable experience in business leadership, solutions consulting, and cutting-edge technology implementation. With a global footprint spanning over 30 countries, Bindesh has earned a reputation as a trusted advisor, guiding banks, fintech firms, and non-banking financial institutions through transformative digital journeys. His strategic acumen has been instrumental in assisting organizations in navigating the complexities of various operating models, from conventional banking institutions seeking digital evolution to fintech disruptors aiming to redefine industry norms. Bindesh's vast experience has equipped him with a profound understanding of the intricate interplay between banking, fintech, and automation. Passionate about driving innovation at the intersection of finance and technology, Bindesh remains committed to empowering C-suite executives across the globe to achieve sustainable growth through the adoption of innovative solutions. His expertise, coupled with his unwavering dedication to advancing the industry, makes him a driving force in shaping the future of financial services.

Generally speaking, money is one of the few universally understood concepts worldwide. Related is a term that many of us have recently heard and even experienced: fintech, the shorter and more popular acronym for financial technology. While fintech may be a universal term, its associations vary from continent to continent, reflecting demographic and geopolitical variances.

For instance, fintech in Africa represents financial inclusion for its underserved population. GSMA's 2025 State of the Industry Report on Mobile Money found that \$1.1 trillion transacted through mobile money providers across sub-Saharan Africa alone. Mobile money has truly revolutionized how people save, transfer and access credit.

Fintech in Europe is associated with convenience and speed. With a stable financial infrastructure, the focus has shifted to seamless payments, open banking and the digital experience. Neobanks, instant payment solutions and buy now pay later (BNPL) dominate this landscape.

In Asia, fintech is synonymous with scale. Just look at India's UPI (Unified Payment Interface) Ecosystem Data, which continues to set new records, and you'll see what I mean. The option to pay as low as \$0.1 and as much as \$5000 has helped drive the adoption of digital payments at an unprecedented level.

Further east, Southeast Asia is a great story on how fintech represents convergence. Super apps like Grab and Gojek have created new business models by integrating payments, e-commerce, transportation and more into a single platform.

As these regional trends mesh, fintech is increasingly shaping a unified narrative focused on seamless experiences using embedded finance, super apps, digital wallets, tap and pay, tokenization, and leveraging advanced technologies such as AI.

AI In Fintech Innovation

AI, especially generative AI, can enhance customer experiences, detect fraud and optimize operations, and the technology is becoming crucial in fintech. AI can help personalize user experiences by analyzing data to recommend products and predict behavior, and it automates customer support with chatbots and virtual assistants.

AI can also improve fraud detection by learning and adapting to new threats continuously. As AI advances, I believe its role in fintech will grow, enhancing the speed, security and accessibility of financial services globally.

Super Apps: Redefining The Consumer Experience

Super apps are transforming consumer interactions with financial services by combining multiple services into one platform. Apps like WeChat and Grab integrate payments, banking, e-commerce and ride-sharing for a unified user experience. This model is being adopted in Europe, America and Africa to boost customer engagement and revenue.

At their core, super apps create ecosystems

enabling users to manage financial needs seamlessly. They integrate services like payday loans, microcredit, tap and pay and digital wallets, offering convenience and removing barriers.

For businesses, super apps provide valuable customer data and enable personalized offers, enhancing engagement and loyalty while unlocking new income sources.

Embedded Finance: The Invisible Advantage

Embedded finance integrates financial services directly into user experiences on various platforms, eliminating traditional barriers to access. This allows businesses to offer holistic solutions at the point of sale, including POS financing, insurance and instant payments, without leaving their core platform.

Haven't we all gotten used to BNPL options in our day-to-day transactions, with the underlying financial institution almost being invisible? Similarly, across emerging markets, financial institutions are using AI-based underwriting to enable access to credit to those without a credit history. The legendary

Adam Smith once talked of the proverbial invisible hand. That invisible hand can be seen at work, powered by modern-day tech like AI and machine learning, helping a merchant get timely finance to replenish their stock or provide convenience to a shopper while transacting on an e-commerce website.

Financial institutions are increasingly becoming ubiquitous and at the same time offering increased personalization and accessibility. With the rapid proliferation of AI, I believe these platforms will continue to gain strength and offer curated experiences, build deeper customer relationships and create new revenue streams.

Payment Orchestration: Streamlining Global Transactions

Have you ever experienced a payment failure when transacting online? You are not the only one. According to industry reports, more than one in 10 transactions fail. The impact is expected to be \$31 billion.

Global commerce is more complex than ever, with businesses serving customers across borders. Smooth payment experiences now require robust and adaptable systems. Payment orchestration platforms optimize

routing and aggregate multiple gateways into one interface, becoming essential for efficient scaling.

This technology allows businesses to offer personalized payment experiences, enabling customers to choose their preferred methods in any region. Seamless transactions are vital for reducing friction and maintaining competitiveness in a globalized market.

Digital Wallets On The Rise

Digital wallets are driving a major shift to cashless and contactless payments. These wallets consolidate payment info, loyalty points and credits in one app, helping businesses boost engagement with tailored offers, rewards and discounts. Issuing banks

use them to promote unique credit products while acquiring banks enhance transaction speed and efficiency for retailers. Their simplicity and ease of use are especially beneficial in emerging markets, helping reach previously unbanked populations.

Security In The Digital World

As digital payments become prevalent, security is paramount. Tokenization, which replaces sensitive payment info with encrypted tokens, is crucial for protecting consumer data and reducing fraud. In addition, tap and pay and host card emulation (HCE) enhance secure, contactless

payments. Imagine paying through your card without the need to carry it. Your phone becomes your card with tap and pay capabilities. Mastercard recently reported that 70% of all in-person transactions are contactless.

A Unified Vision For Fintech's Future

Embedded finance, payment orchestration, digital wallets and tokenization are transforming financial innovation, creating an interconnected system poised to reshape global commerce. AI is expected to redefine financial services, making them more

accessible, secure, efficient and personalized.

For businesses to successfully navigate these changes, embracing innovation and customer-centricity is essential. Continued innovation will lead fintech toward a more efficient, intelligent and secure future.

The need to have a neutral Payment Orchestration Layer and how it can help resolve payment challenges for Digital Merchants

— BY SATYAJIT PATRNAIK





Satyajit Pattnaik With over 11 years of experience in Retail banking, Payments, Digital banking, Risk and regulations, Satyajit holds strong expertise as a sales consultant in banking and financial services. Over his career span he has played a key role in multiple banking transformations and modernizations globally. Currently he is engaged as a solution expert for mobiquity One - OL and aspires to enable frictionless payments and unified e-commerce for digital merchants in India.

In the rapidly evolving digital commerce landscape, it has become imperative for digital merchants to have a robust payment system. In India the average transaction success rate is around 70% which becomes a major concern for e-commerce players. Out of the failed transactions, payment declines are a significant issue, with around 15% of online transactions being declined. This can be due to various reasons such as gateway error, bank server issue, insufficient funds, incorrect details, fraud etc. These declines not only frustrate customers but also result in lost sales for merchants. 42% of potential customers are likely to abandon carts if their cards are declined. Online shoppers expect faster checkout experience with more options, but managing multiple integrations becomes a hassle for merchants.

Payment orchestration layers have emerged as a crucial component for digital merchants. These layers streamline and optimize the payment process, addressing various challenges that merchants face. It manages and optimizes the entire payment process, ensuring a seamless and efficient payment experience for both merchants and customers. However recent trends in e-commerce payments have shown issues with orchestration layers having a payment aggregator license. FinTechs and payment gateways are cutting off ties with such orchestration platform as there can be biases from such orchestration players in favour of their own payment gateways or partners and it can reduce revenue for other PGs.

Few issues with such orchestration players can be:



Vendor Lock-In

Relying on a single vendor for both the orchestration layer and the payment gateway can lead to vendor lock-in. This can limit flexibility and make it difficult to switch providers if needed.



Cost

While a combined solution might offer some cost savings, it can also lead to higher costs if the vendor charges premium rates in future for their integrated services.



Biased routing

Possibility of major part of the payments traffic being redirected to their own PGs can limit merchants to achieve optimized Merchant discount rates.

Neutral Orchestration Layer provider such as Comviva's mobiquity®

One supports open standards and interoperability making it easier to integrate with multiple PGs and switch gateways if needed. It uses AI based advanced smart routing logic which is non-biased towards any single payment gateway that optimizes transaction paths, reduces costs, and improves conversion rates. Few other benefits of having such an orchestration layer includes:

Enhanced Payment Flexibility

One of the primary benefits of payment orchestration layers is the ability to integrate with multiple PSPs. This flexibility allows merchants to offer a wide range of payment options to their customers, including credit cards, digital wallets, and alternative payment methods. By accommodating diverse customer preferences, merchants can increase conversion rates and reduce cart abandonment.

Improved Transaction Success Rates

Payment orchestration layers intelligently route transactions to the most appropriate PSP based on factors such as transaction type, geographic location, and historical performance. This dynamic routing minimizes the risk of transaction failures and declines, leading to higher success rates and improved customer satisfaction.

Cost Optimization

By leveraging multiple PSPs, payment orchestration layers enable merchants to optimize transaction costs. They can route transactions through the most cost-effective PSPs, taking advantage of lower processing fees and favourable exchange rates. This cost optimization can significantly impact a merchant's bottom line, especially for businesses with high transaction volumes.



Streamlined Operations

Managing relationships with multiple PSPs can be complex and time-consuming. Payment orchestration layers simplify this process by providing a single point of integration and management. Merchants can easily add or switch PSPs without extensive technical changes, reducing operational overhead and allowing them to focus on core business activities.

Enhanced Security and Fraud Prevention

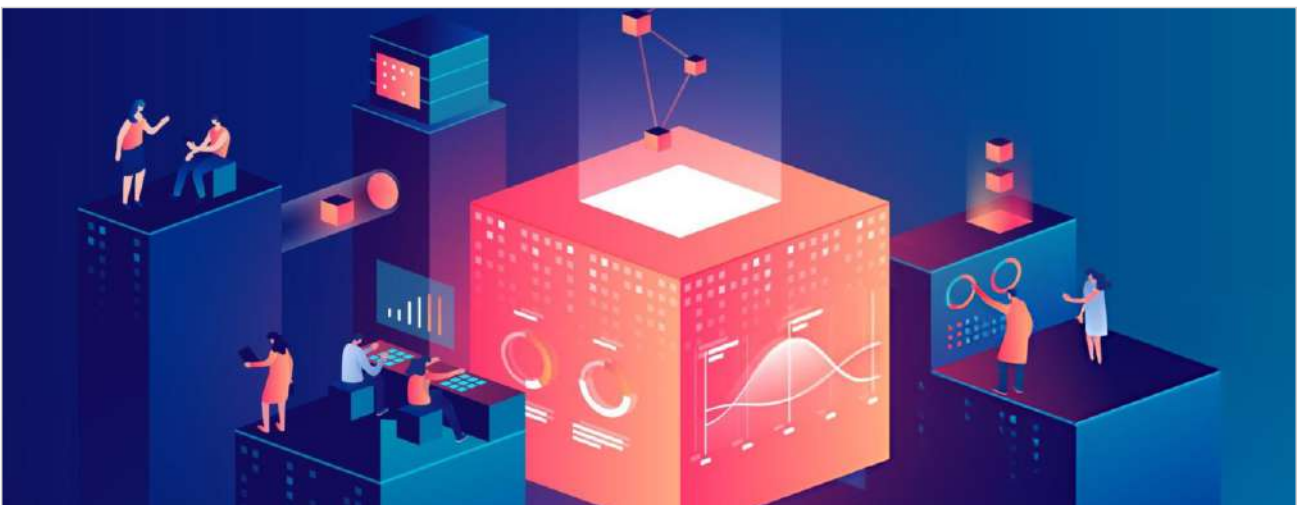
Security is a critical concern for digital merchants. Payment orchestration layers offer advanced fraud detection and prevention mechanisms, such as machine learning algorithms and real-time monitoring. By analysing transaction data across multiple PSPs, these layers can identify and mitigate fraudulent activities more effectively, protecting both merchants and customers.

Global Reach

For merchants looking to expand internationally, payment orchestration layers provide the necessary infrastructure to support cross-border transactions. They enable merchants to accept payments in multiple currencies and comply with local regulations, facilitating seamless global commerce. This capability is essential for businesses aiming to tap into new markets and reach a broader customer base.

Data Insights and Analytics

Payment orchestration layers offer comprehensive reporting and analytics tools that provide valuable insights into payment performance. Merchants can access detailed transaction data, identify trends, and make data-driven decisions to optimize their payment strategies. These insights help merchants understand customer behaviour, improve payment processes, and enhance overall business performance.



Comviva's payment orchestration platform **mobiquity[®] One** is designed keeping in mind the above insights and it simplifies payment management by unifying all your gateways into a single, efficient platform. It helps improve transaction success rates, reduce costs, and boost customer satisfaction.

What key challenges can
mobiquity[®] One
resolve for digital merchants?



Reducing Payment Failures

Online businesses see Payment Conversion Rate improvement up to 05% with smart routing using mobiquity® One. Payment failures can be a significant challenge for digital merchants, leading to lost sales and frustrated customers. mobiquity® One addresses this issue by dynamically routing transactions to the most reliable PSPs, reducing the likelihood of failures and ensuring a smooth payment experience.

Managing Payment Complexity

According to a report, 75% of online shoppers want faster checkouts, and 56% desire more payment options. However, integrating these options requires significant effort and manpower from merchants. As digital merchants grow, managing multiple payment methods and PSPs becomes increasingly complex. mobiquity® One simplifies this complexity by providing a unified platform for payment processing. Merchants can easily manage and optimize their payment ecosystem, reducing administrative burdens and improving efficiency.

Enhancing Customer Experience

A seamless payment experience is crucial for customer satisfaction and loyalty. mobiquity® One enables merchants to offer a wide range of payment options, reduce transaction failures, and enhance security. These improvements contribute to a positive customer experience, encouraging repeat business and fostering long-term relationships. It also offers a unified checkout experience with conversion boosters that can provide a seamless payment experience for the end customers.

Cost Savings

It is also observed that online businesses experience a Reduction in MDR Cost up to 15 basis points (0.15%), through the least cost routing logic enabled by smart routing through mobiquity® One. Our platform intelligently routes transactions through the most cost-effective and reliable payment gateways. This reduces transaction fees and minimizes the risk of failed payments.

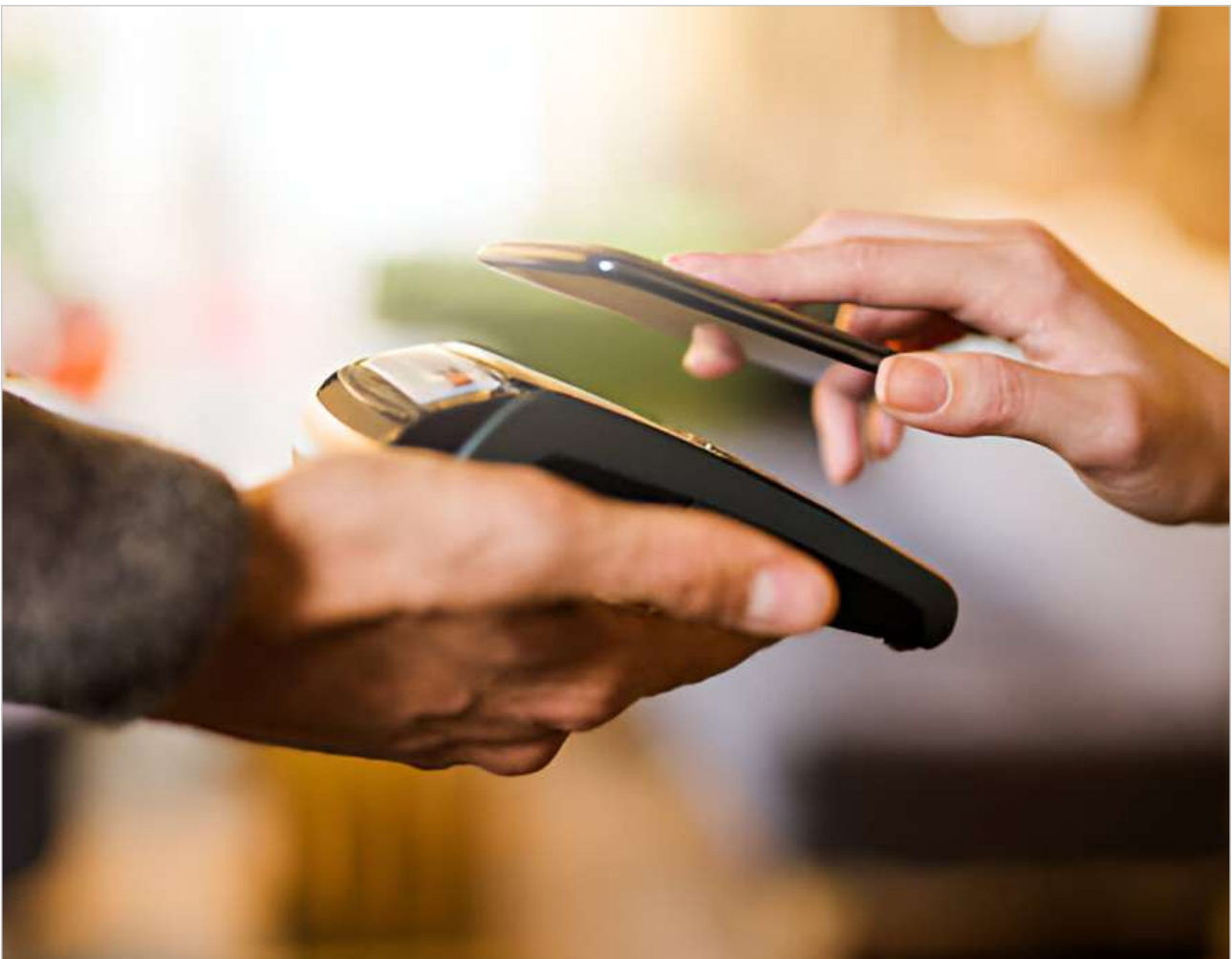


Adapting to Market Changes

The payment landscape is constantly evolving, with new payment methods and regulations emerging regularly. mobiquity® One layers provide the flexibility to adapt to these changes quickly. Merchants can easily integrate new payment options and comply with regulatory requirements, ensuring they stay competitive in the market.

mobiquity® One offers numerous benefits for digital merchants, from enhanced payment flexibility and improved transaction success rates to cost optimization and streamlined operations. The solution recently went live with India's leading gifting platform to transform its payment experience and within 6 months it has increased payment success rate to over 80%, reduced MDR costs with more payment options like UPI, wallets, net banking, and cards enhancing customer experience.

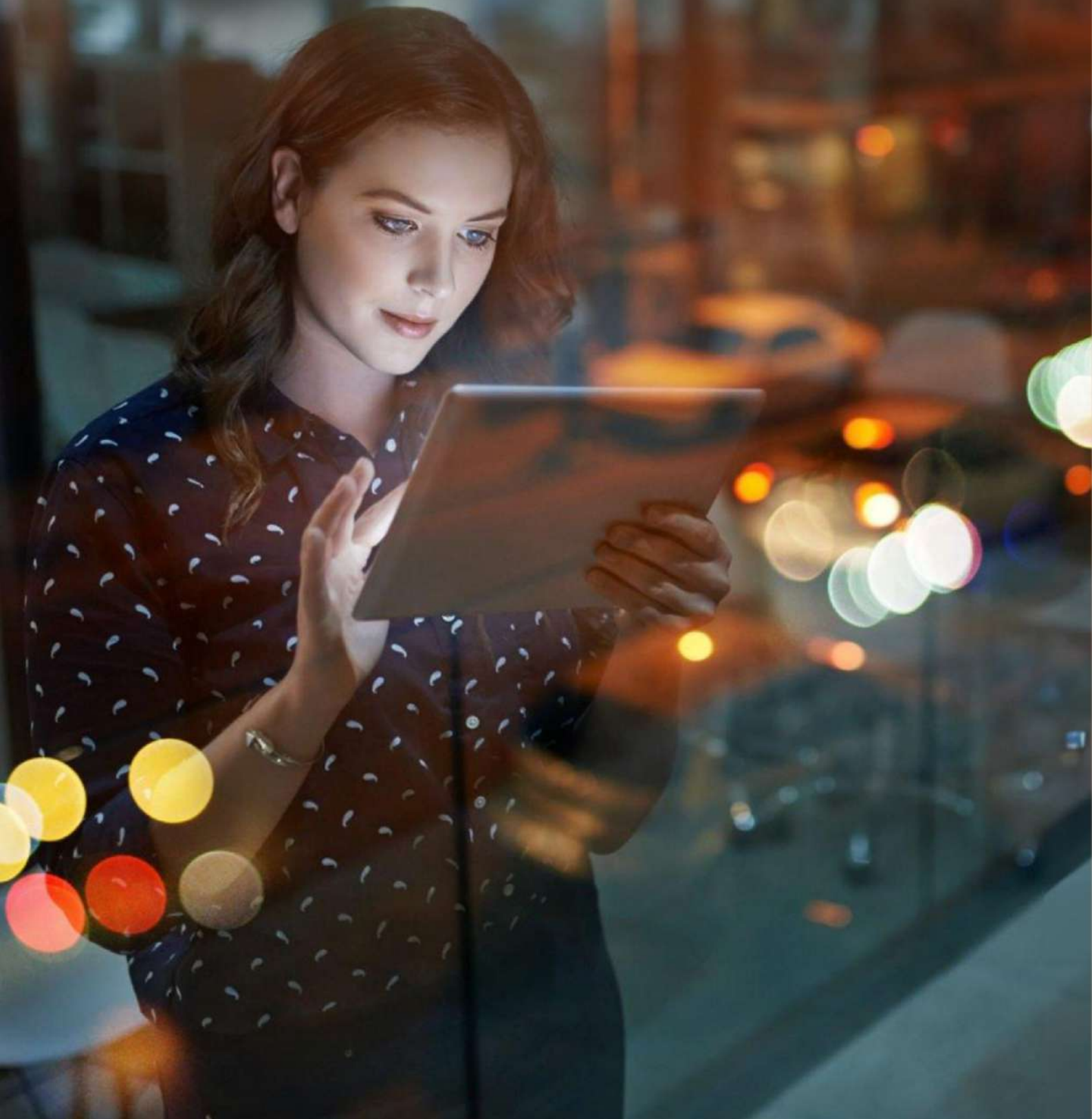
By addressing key payment challenges and providing a neutral platform for payment gateways mobiquity® One enables merchants to provide a seamless and secure payment experience for their customers. As digital commerce continues to grow, payment orchestration layers such as mobiquity® One will play an increasingly vital role in helping merchants navigate the complexities of the payment ecosystem and achieve long-term success.





Strengthening Security with Client-Centric Solutions

— BY DEEPANSHU ARORA





Deepanshu Arora is a professional with 4 years of experience, specializing in Java, security, and performance optimization. He focuses on developing secure, high-performance applications while staying updated with the latest industry advancements.

In today's digital landscape, security isn't just a priority—it's a necessity. At Comviva, we've always strived to stay ahead of the curve, ensuring our systems and services are not only robust but also adaptable to the diverse needs of our clients. This year, we've taken significant strides in enhancing the security framework of PreTUPS™, introducing new features that offer unparalleled configurability and client-specific customization.

Enhanced Security Framework

To strengthen the foundation of our security ecosystem, we've integrated several advanced mechanisms into the PreTUPS™ platform. These measures are designed to provide airtight protection against threats while ensuring data integrity and confidentiality throughout every transaction.

Key enhancements include

Nonce Implementation

A unique, one-time-use value ensures each transaction request is distinct, preventing replay attacks and ensuring the authenticity of client interactions.



Signatures

Cryptographic signatures are used to ensure data integrity by verifying that the data received is exactly as it was sent, without any alterations during transmission.



Request-Response Encryption

All communication within the system is secured using end-to-end encryption. By encrypting both the requests sent by clients and the responses they receive, we ensure that sensitive information remains confidential and safe from interception.



Response Code Checksum Validation

To ensure the reliability of transaction status, we've implemented a checksum for response codes. This mechanism enables clients to validate that the response codes received are accurate and have not been altered during transmission.



These enhancements collectively fortify the PreTUPS™ platform, enabling clients to operate securely and confidently in an increasingly complex threat environment.

Configurability: Security Tailored to You

At the heart of our security enhancements lies flexibility. We understand that different clients have unique needs and operational priorities. That's why every feature in the **PreTUPS™** security framework is configurable, offering clients the freedom to choose the level of security that best aligns with their requirements.

Key options include



Customizable Security Features

Clients can opt in or out of features such as nonce implementation, signatures, request-response encryption, and response code checksum validation. This allows them to strike the right balance between security and operational efficiency.



Granular Configurability

From defining encryption parameters to selecting validation mechanisms for transactions, clients have full control over how these enhancements integrate into their systems.



Client-Specific Nonce Algorithms

Recognizing the diverse needs of our clients, the nonce generation algorithm can be customized to meet their specific security standards and protocols, ensuring a tailored approach to protection.

This client-centric approach not only ensures adaptability but also empowers clients to take ownership of their security posture, building confidence in their operational resilience while remaining aligned with their business goals.

Conclusion

The enhanced **PreTUPS™** security framework reflects our commitment to robust, adaptable, and client-focused solutions. With features like nonce implementation, signatures and request-response encryption—fully configurable to client needs—we empower businesses to tailor their security strategies for resilience and compliance.

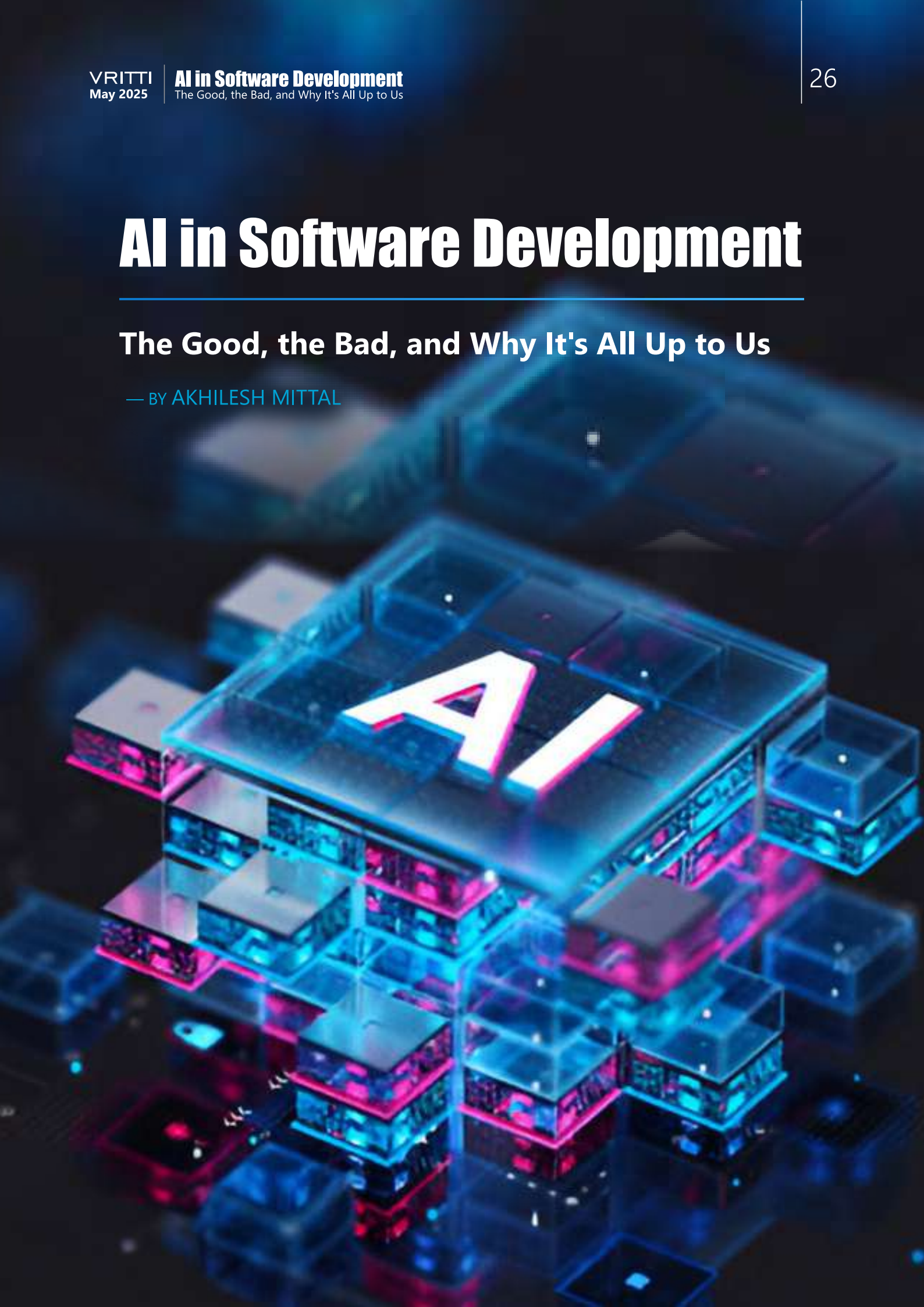
In a rapidly evolving threat landscape, **PreTUPS™** ensures clients can operate with confidence, knowing their systems are secure and adaptable to their unique requirements. Together, we're shaping a safer digital future.



AI in Software Development

The Good, the Bad, and Why It's All Up to Us

— BY AKHILESH MITTAL





Akhilesh Mittal is a seasoned technical architect with over 14.5 years of experience in the IT industry. Specializing in Cloud related technologies, he has a deep understanding of the telecom domain, making him a valuable asset to any project or team. With a passion for innovation and problem-solving, he is dedicated to staying at the forefront of technological advancements and delivering cutting-edge solutions to clients.

Artificial Intelligence (AI) is everywhere these days — especially in software development. From tools like GitHub Copilot to AI-driven code reviews and automated testing, AI is changing the way we write, test, and manage code. But here's the catch: AI is just a tool. How it impacts us — whether for good or bad — depends entirely on how we use it. In this article, we will dive into the pros and cons of AI in the dev world and chat about how our choices will shape the future of tech.

The Good Stuff: How AI Can Make Development Awesome

Boosting Productivity with GitHub Copilot

AI can help developers work faster, and GitHub Copilot is one of the coolest examples. Copilot is like having a coding buddy that's always got your back. It suggests code snippets, helps with auto-completion, and can even generate entire functions based on what you're writing. For new developers, it's like having a mentor in your IDE. For experienced devs, it speeds up repetitive tasks so you can focus on the fun, complex stuff.

Example: Imagine you're writing a function to fetch data from an API. As you type, Copilot starts suggesting the rest of the code you need — handling error catching, parsing, and everything else — without you having to search through docs. It's fast and efficient, and it just works.



AI-Powered Code Reviews: A Game Changer

Writing code is only half the job. Reviewing it? That's the other half. And it can be a real grind. AI-powered tools like DeepCode (now part of Snyk) are here to help. They automatically review your code for bugs, security issues, and general best practices. These tools make the code review process a lot faster, and they also help teams catch

problems early, so your code's higher quality from the get-go.

Example: Let's say you submit a pull request. DeepCode will go through it and flag any potential issues — like security vulnerabilities or bad coding practices — and even suggest fixes. It's like having a second pair of eyes that doesn't get tired or miss things.

Better Code Coverage and Testing

We all know how important it is to test our code. But testing can be a pain, right? Enter AI. AI-driven testing tools can automatically create test cases and analyze your codebase to identify areas that haven't been tested yet. This helps ensure that your app is bug-free and doesn't break when you roll out updates.

Example: Test.ai uses AI to simulate real user behavior, so you don't have to manually test every button or feature. The tool runs through your app, finds edge cases, and makes sure everything works smoothly. This means fewer bugs in production and faster release cycles.

The Bad Stuff: Where AI Can Go Wrong

Becoming Too Dependent on AI

Sure, GitHub Copilot and AI reviews are awesome, but there's a catch: too much reliance on AI could make us lazy. If we start leaning on AI for every little thing, we risk losing our ability to think critically or solve problems on our own. We might get so used to AI doing the heavy lifting that we forget how to code without it.

Example: Imagine using Copilot for every function you write, even when it's just basic stuff. Over time, you might find that you can't remember how to write certain algorithms or solve problems without Copilot's suggestions.

AI Can Be Biased

AI is not perfect, and it can sometimes be biased — especially if it is trained on bad data. If the AI's training data includes outdated or biased coding practices, it might suggest solutions that aren't ideal for your situation. This is a big problem, especially when it comes to sensitive areas like security or accessibility.

Example: Let's say an AI code review tool flags your perfectly valid and unconventional approach as an error just because it is not common practice. Or, worse, it suggests code that could lead to security flaws if the AI doesn't fully understand how to handle certain edge cases.

Security Concerns

As useful as AI is, it can also open the door to security risks. If AI tools generate or review code incorrectly, they could introduce vulnerabilities into your application. You

don't want AI to write insecure code for you — especially when it comes to things like API calls, user input validation, or authentication.

How We Can Use AI Wisely: It's All About Balance

AI is a tool, and like any tool, it can be incredibly powerful when used the right way.

AI + Human Expertise = Best Results

AI is great for automating repetitive tasks and speeding up development. But it is not a substitute for your brain. Use AI tools like GitHub Copilot to help with mundane code, but don't let it replace the critical thinking you need for more complex tasks.

Training AI Responsibly

AI is only as good as the data it is trained on. That means we need to make sure AI tools are trained with up-to-date data.

Keep Learning

As AI becomes more prevalent, it is important to stay up-to-date with new tools, techniques, and best practices. Don't just rely on AI to do everything for you — continue learning, experimenting, and growing as a developer.



Conclusion: The Power of Choice

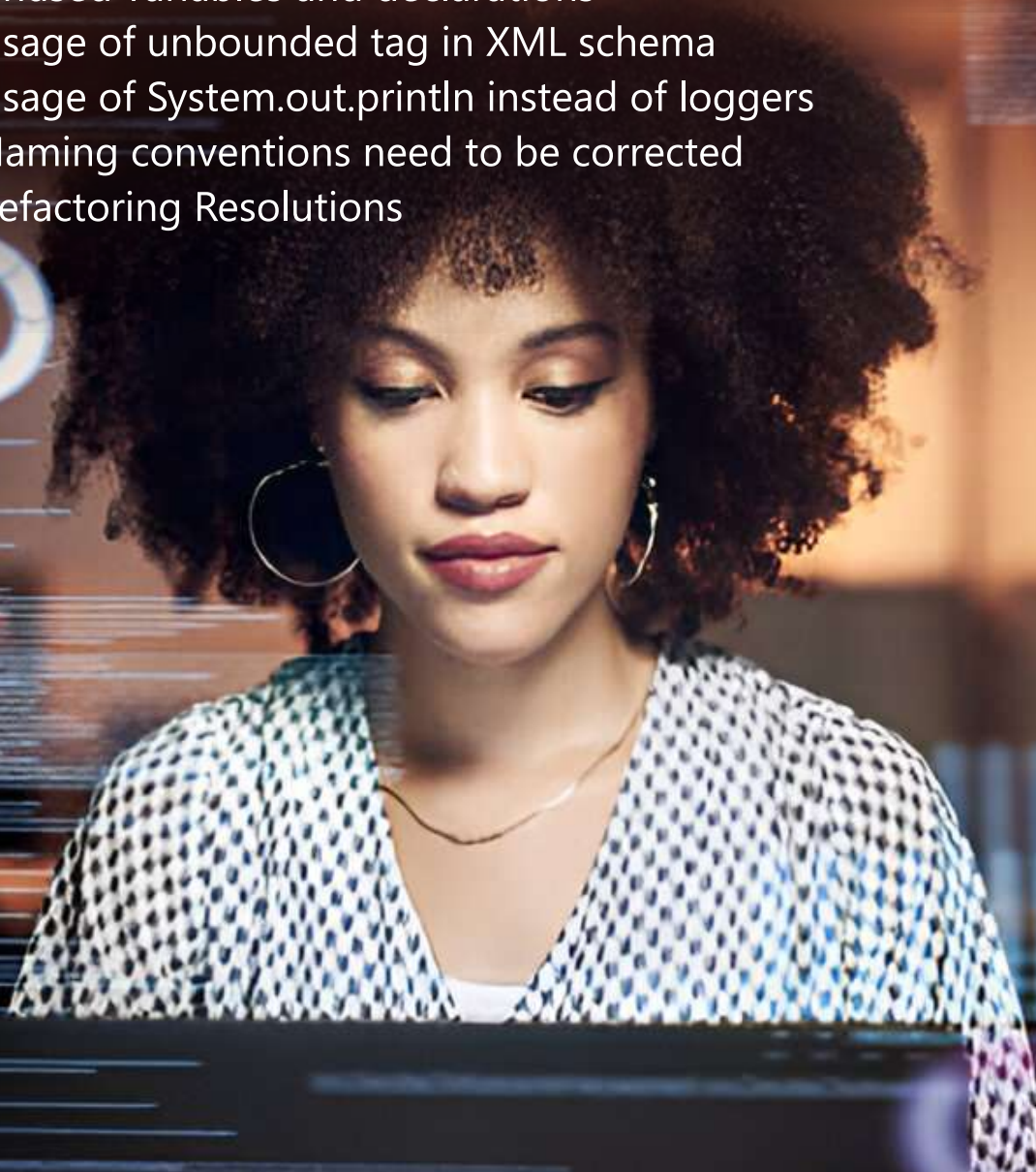
The choice is yours — how we use AI today will shape the future, but we can't predict exactly where it will take us. The key is in making thoughtful decisions and embracing the potential responsibly.

Common Vulnerabilities and Refactoring Resolutions

— BY BHRIGUMONI RABHA

Common reasons of vulnerabilities:

- Resource not closed properly
- Document XML not parsed with security injection
- Exceptions not handled
- Unused variables and declarations
- Usage of unbounded tag in XML schema
- Usage of System.out.println instead of loggers
- Naming conventions need to be corrected
- Refactoring Resolutions



ISSUE 1

Poor Error Handling: Overly Broad Catch

Solutions

To catch specific exceptions that are expected and can be handled appropriately.

Issue Details

JmsConnector : Line 111

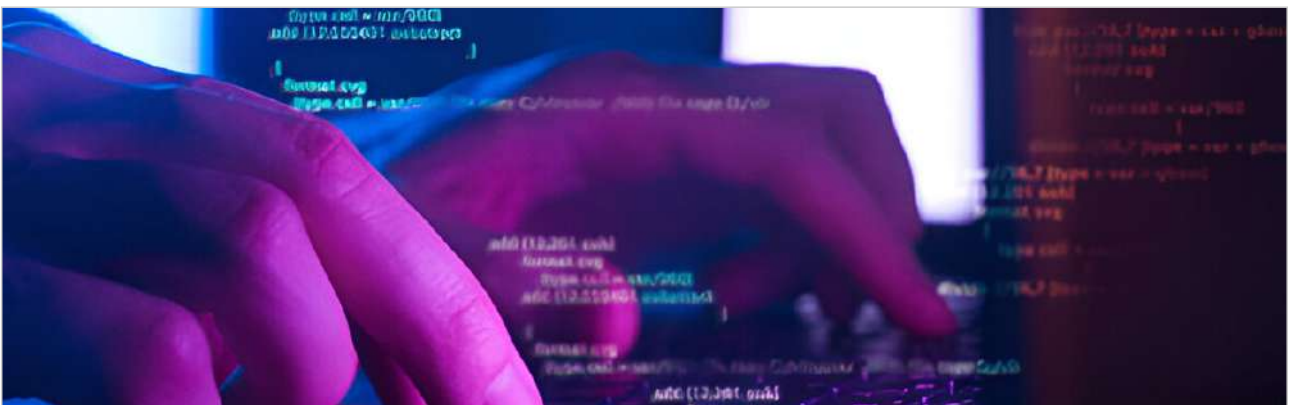
EIG1.1.0/src/main/java/com/comviva/mfs/eig/connector/JmsConnector.java, line 111

(Poor Error Handling: Overly Broad Catch)

```
108 try {
109     responseObject = consumer.receive(1000000);
110     returnedObject = ((ActiveMQTextMessage)responseObject).getText();
111 } catch (Exception ex) {
112     log.error("Exception has raised in JmsConnector: class ",ex)
```

Fix

```
catch (JMSEException jmse) {
log.error("JMSEException occurred in JmsConnector: ", jmse);
} catch (ClassCastException cce) {
log.error("ClassCastException occurred in JmsConnector: ", cce);
} catch (Exception ex) {
log.error("An unexpected exception occurred in JmsConnector: ", ex);
}
```



ISSUE 2

Poor Error Handling: Overly Broad Throws

Solutions

throw specific exceptions that are more meaningful to the context of the method.

Issue Details

EIG1.1.1/src/test/java/com/comviva/mfs/eig/sample/webservices/Service.java, line 41 (Poor Error Handling: Overly Broad Throws)

Kingdom: Errors

Scan Engine: SCA (Structural)

Sink Details

Sink: Function: hitXMLToEIG

Enclosing Method: hitXMLToEIG()

File: EIG1.1.1/src/test/java/com/comviva/mfs/eig/sample/webservices/Service.java:41

```
38 * @throws Exception
```

```
39 * @throws EIGExceptionObject
```

```
40 */
```

```
41 public static String hitXMLToEIG(String strMsg, String strUrl)
```

```
42 throws Exception, EIGExceptionObject {
```

```
43 // Code added for Tango 4.x and Tango 2.2 merging
```

Fix

```
public static String hitXMLToEIG(String strMsg, String strUrl)
```

```
throws IOException, EIGExceptionObject {
```

```
// Code added for Tango 4.x and Tango 2.2 merging
```

```
strUrl = ProjectConfig.getProperty(URL_Path_Constant.valueOf(strUrl)  
.toString());
```

```
String connectionTimeOut = ProjectConfig  
.getProperty(Constants.CONN_TIMEOUT);
```

```
String readTimeOut = ProjectConfig  
.getProperty(Constants.READ_TIME_OUT);
```

ISSUE 3

Poor Error Handling: Program Catches NullPointerException

Solutions

Handle Null issue with code

Issue Details

Package: com.comviva.mfs.eig.exceptionhandlers

ELG1.1.1/src/main/java/com/comviva/mfs/eig/exceptionhandlers/

GenericExceptionHandler.java, line 94 (Poor Error Handling: Program Catches
NullPointerException)

Kingdom: Errors

Scan Engine: SCA (Structural)

Sink Details

Sink: CatchBlock

Enclosing Method: transformMessage()

File: ELG1.1.1/src/main/java/com/comviva/mfs/eig/exceptionhandlers/
GenericExceptionHandler.java:94

```
91 StringBuilder msg = new StringBuilder(messageDescription);
```

```
92 msg.append(parameter);
```

```
93 messageDescription = msg.toString();
```

```
94 } catch (NullPointerException e) {
```

```
95 INFOLOG.info("Null Property received from Properties  
file in GenericExceptionHandler: Class",e);
```

```
96 messageCode = ProjectConfig.getProperty(Constants.DEFAULT_EXCEPTION_CODE);
```

```
97 if(XmlUtil.parametersAreNull(exceptionCause)) {
```

Fix

```
try {
```

```
if (messageDescription != null && parameter != null) {
```

```
StringBuilder msg = new StringBuilder(messageDescription);
```

```
msg.append(parameter);
```

```
messageDescription = msg.toString();
```

```
} else {
```

```
// Handle the case where messageDescription or parameter is null
```

```
INFOLOG.warn("Null value for messageDescription or parameter");
```

```
}
```

```
} catch (Exception e) {
```

```
INFOLOG.error("Unexpected exception in GenericExceptionHandler: ", e);
```

ISSUE 4

Poor Logging Practice: Use of a System Output Stream

Solutions

To use loggers in place of System output stream

Issue Details

Package: com.comviva.mfs.eig.services

Core_EIG_UI/src/main/java/com/comviva/mfs/eig/services/

GenerateRuleAndTemplate.java, line 156 (Poor Logging Practice: Use of a System Output Stream)

```
153 }
```

```
154
```

```
155 } catch (FileNotFoundException | UnsupportedEncodingException e1) {
```

```
156 System.out.println("");
```

```
157 } catch (IOException e) {
```

```
158 // TODO Auto-generated catch block
```

```
159 e.printStackTrace();
```

Fix

```
LOGGER.info("Completion of method");
```



ISSUE 5

Poor Style: Confusing Naming

Solutions

To use consistent naming conventions

Issue Details

EIG1.1.1/src/main/java/com/comviva/mfs/eig/datatypes/Id.java, line 34 (Poor Style: Confusing Naming)

Kingdom: Code Quality

Scan Engine: SCA (Structural)

Sink Details

Sink: Field: hashCode

File: EIG1.1.1/src/main/java/com/comviva/mfs/eig/datatypes/Id.java:34

31

32 private String interfaceld;

33 private String serviceld;

34 private final int hashCode;

35

36 public Id(String interfaceld, String serviceld) {

37 this.interfaceld = interfaceld;

Fix

```
public class Identifier {
```

```
    private String interfaceldentifier;
```

```
    private String serviceldentifier;
```

```
    private final int cachedHashCode;
```

```
    public Identifier(String interfaceldentifier, String serviceldentifier, int cachedHashCode) {
```

```
        this.interfaceldentifier = interfaceldentifier;
```

```
        this.serviceldentifier = serviceldentifier;
```

```
        this.cachedHashCode = cachedHashCode;
```

```
    }
```

ISSUE 6

Poor Style: Value Never Read

Solutions

To remove such fields which are never used

ISSUE 7

Portability Flaw: Locale Dependent Comparison

Solutions

Use `Pattern.quote()`: we can ensure that the separator strings are treated as literals, avoiding issues with locale-dependent characters or special regex characters.

Issue Details

Package: `com.comviva.mfs.eig.rulesEngine`

`Core_EIG_UI/src/main/java/com/comviva/mfs/eig/rulesEngine/EIGRulesEngine.java`, line 383 (Portability Flaw: Locale Dependent Comparison)

```
380 String tlvLengthValues[] = counter[13].split(
381 EIG_AutomationConstants.VALUESPLITBY.getStatusCode());
382 for(String lengthValuePair : tlvLengthValues){
383 writer.println();
384 String valuesMap[] = lengthValuePair.split(
385 EIG_AutomationConstants.SUBVALUESPLITBY.getStatusCode());
386 if(valuesMap.length > 1)
```

Fix

```
private static void writeValueChangeRequiredRules(PrintWriter writer, String[] counter) {
String[] conversionValues =
counter[10].split(Pattern.quote(EIG_AutomationConstants.VALUESPLITBY.getStatusCode()));
for (String values : conversionValues) {
writer.println();
String[] valuesMap =
values.split(Pattern.quote(EIG_AutomationConstants.SUBVALUESPLITBY.getStatusCode()));
if (valuesMap.length > 1) {
writer.println("<value parameter_value_client=\"" + valuesMap[0] +
"\ parameter_value_server=\"" + valuesMap[1] +
"\ />");
```

ISSUE 8

Privacy Violation

Solutions

to use standard base64 encoder/decoder in java8.

Issue Details

Sink: java.net.URLConnection.setRequestProperty()

Enclosing Method: getConnection()

File:

EIG1.1.1/src/main/java/com/comviva/mfs/eig/transformers/mapper/ExtGetwayUtility.java:133

Taint Flags: BASE64_ENCODED, NO_NEW_LINE, PRIVATE,

VALIDATED_HTTP_PARAMETER_POLLUTION

```
130 url = new URL(strUrl);
```

```
131 urlConnection = (HttpURLConnection) url.openConnection();
```

```
132 if(bProxySet){
```

```
133 urlConnection.setRequestProperty("Proxy-Authorization","Basic " + new  
sun.misc.BASE64Encoder().encode(
```

```
134 (proxyUser + ":" + proxyPassword).getBytes())
```

```
135 );
```

```
136 }
```

Fix

```
public static HttpURLConnection getConnection(String strUrl) throws MalformedURLException,  
IOException, ProtocolException {
```

```
URL url = new URL(strUrl);
```

```
HttpURLConnection urlConnection = (HttpURLConnection) url.openConnection();
```

```
String proxyEnabled = System.getProperty("http.proxySet");
```

```
if (proxyEnabled != null && "true".equalsIgnoreCase(proxyEnabled)) {
```

```
String proxyUser = System.getProperty("http.proxyUser");
```

```
String proxyPassword = System.getProperty("http.proxyPassword");
```

```
if (proxyUser != null && proxyPassword != null) {
```

```
String encodedCredentials = Base64.getEncoder().encodeToString((proxyUser + ":" +  
proxyPassword).getBytes());
```

```
urlConnection.setRequestProperty("Proxy-Authorization", "Basic " + encodedCredentials);
```

```
}
```

```
}
```

```
return urlConnection;
```

In The Media

Awards

- **Juniper FDA – Best Digital Wallet (GOLD):**
2nd year in a row
- **FS Tech Award – Financial Inclusion**
- **Drivers of Digital Award – Best Payment Facilitator**

Analyst Mentions

- **Global Digital Wallets Market:**
2024-2029 by Juniper Research
- **Global Mobile Money in Emerging Markets:**
2024-29 by Juniper Research
- **Merchant Payment Platform** – SPARK Matrix,
Quadrant Knowledge Solutions

Article

The Contactless Payment Revolution
by Srinivas Nidugondi

The logo for Comviva, featuring the word "comviva" in a bold, lowercase, sans-serif font. Below the main text, the tagline "A TECH MAHINDRA COMPANY" is written in a smaller, all-caps, sans-serif font.

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