

# IT NEXT

FOR THE NEXT GENERATION OF CIOs

## The 2019 Enterprise

# .ai

## Startup Guide

60 Indian B2B AI startups  
and their solutions



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# AI: Why a startup strategy is an imperative



A large vendor is supposed to know your business well, send you nice marketing collateral and keep following up. Nothing wrong if you expect that as a matter of right. It will be disastrous to have the same expectations from a startup

**Shyamanuja Das**

Artificial Intelligence is eating the world. AI is the driver of the much-hyped data-driven business models. While the agenda for AI application is being driven right from the top—starting with the national governments—the technology direction is influenced a lot by the startups.

India has one of the largest AI startup base. While all top IT vendors offer AI solutions, for enterprise IT managers, it would be imprudent not to leverage this startups base—especially when they are looking for AI as a competitive differentiator.

Yet, awareness about the startups is really low among IT managers community. What is worse, many of them believe that those 4-5 startups that do all the song and dance are the universe.

In fact, that is dangerous. Not all startups are good at reaching out to you. A large vendor is supposed to know your business well, send you nice marketing collateral and keep following up. Nothing wrong if you expect that as a matter of right. It will be disastrous to have the same expectations from a startup.

Most startups are focused around one of the three—a specific business problem, a technology or a few new use cases in a specific vertical. They may not be smart marketers. It is in your interest that you should be proactive in probing what exactly are they doing, how robust and polished are their solutions. The better you do that, the better you build your competitive advantage.

Judging a startup by client reference too is tricky. Startups often get the first couple of reference through personal networks. While a successful implementation is a definite plus, the lack of them is not a sign of weakness. What matters is what business problem they solve, how robust is the technology and how is the support—not necessarily how big is the client name.

I guess there are more than 100 startups (those that are less than 10 years, by our definition) working in AI space. We have managed to study 60 of them and presented before you.

If you really want to build your competitive advantage leveraging AI, you cannot not have a startup strategy—and a proactive one at that. ■



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# EXTRA Curricular



*Drumming  
a rhythm of  
stress-free life  
and happiness*

## Play On...

NEXT100 Winner 2017 **Muneesh Kumar**, Vice President – Technology, XcelServ Solutions, shares his intense passion for music and his love of playing ‘Djembe’

*“Music has healing power. It has the ability to take people out of themselves for a few hours.” – Elton John*

*“Music is moonlight in the gloomy night of life.” – Jean Paul*

*“It’s easy to play any musical instrument: All you have to do is touch the right key at the right time and the instrument will play itself.” – Johann Sebastian Bach*

*“Setting my mind on a musical instrument was like falling in love. All the world seemed bright and changed.” – William Christopher Handy*



**M**usic is like a soothing soul to me and playing a musical instrument is something which I always longed to do. I was fascinated by percussion instrument since childhood but due to some other priorities and a busy lifestyle, I couldn't find the time and resource to pursue this as a hobby. After quite a while, I got a chance to attend ‘Drum Circle’ at Zorba in Delhi. The drummers at the ‘jam’, inspired me a lot and I decided to learn ‘Djembe’. This is basically a rope-tuned skin-covered goblet drum played with bare





## Muneesh Kumar

*Snapshot*

**Muneesh Kumar** is Vice President – Technology at XcelServ Solutions. He was a NEXT100 Winner in 2017. Muneesh has previously worked in organizations like Fareportal India and

Hyperquality. He has done his Masters and PG Diploma in Computer Applications. He also has certifications in Prince2 and Project Management Professional (PMP).

hands that originated from West Africa. As per the name, 'Djembe' comes from the saying "Anke djé, ankebé" which translates to "everyone gather together in peace" and defines the drum's purpose. It is a versatile, easy to carry instrument that can be played anywhere, and it doesn't matter if you have any prior knowledge of music or not; you can still play 'Djembe'.

I started my look-out for someone who could help me understand music and bring regenerate my inner love for rhythm instruments. The search ended with a young boy, Vaibhav Chaturvedi, a Delhi-based artist. I got his number from a newspaper article and called him.

Vaibhav is India's youngest 'rhythm facilitator' as he is facilitating many drum circles in the country from a very young age. Playing some amazing exotic and folk instruments, this self-taught artist and my teacher now plays nearly 16 instruments, some of which are even unheard of. He is also famous for his street plays and is known for his fund-raising busking skills in the city.

His teaching style takes you from a very basic level to making you a confident performer in a very short span of time. According to him, music cannot be learned, it has to be felt. He always says, "Just feel the beat, be relaxed and calm and start



*Playing in peace*



thumping your 'Djembe'!

In other ways, Djembe serves as a stress-buster from our busy life as well as helps us to come out of our social media addictions like Facebook, WhatsApp, Twitter, Instagram, etc. It enables us to interact with like-minded people, increase our social circle and spread joy amongst everyone, exactly like I've done and witnessed at the Delhi Drum Circle and Vegas Tribe.

So, my advice to wannabe learners and performers is to just feel the music and make it a part of life! ■

*As told to Dipanjan Mitra, Team ITNEXT*



# The 2019 Enterprise

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## Startup Guide

60 Indian B2B AI startups  
and their solutions

By Shyamanuja Das

Arya.ai Agara Labs Aindra Systems Active.ai Artivatic Data Labs BrainaSoft  
Avaamo Bash.ai Avanseus CreditVidya  
Boxx.ai Charmboard Discovery AI CustomerSuccessBox  
Cuddle.ai Embibe  
Fabulyst Haptik Formcept  
Fluid AI Innefu Labs  
Mad Street Den Morph.ai  
Manthan Noodle.ai  
My Ally Mihup Optacredit  
Niramai Health Analytix Peritus.ai Rockmetric  
Playment Staqu ten3T Supertext AI  
TAO Automation Tricog Health Service ThirdWatch  
vPhrase Vernacular.ai  
Uncanny Vision VideoKen  
Zenatix



As businesses try to become data-driven, AI will power that journey. We present a list of startups who, through their cutting-edge work on enterprise AI, can help you build a competitive advantage.

**T**he web domain associated with a small country, which few would even be able to point out on a world map, is today the most sought after. Anguilla, whose top-level domain is .ai, has seen an explosive growth in registration of these domains, as more and more companies working in the artificial intelligence space queue up to register for domains \*.ai.

Artificial Intelligence, is red hot.

Artificial Intelligence will change the world. It will change the equation between men and machine. It will change the way humankind lives (and dies).

No one is taking these prognoses lightly. When was the last time you heard all major nations in the world—US, EU countries, China, India—coming out with national strategies on a technology?

Whether these national strategies—differing widely in their objectives (China wants to use AI to compete; EU is worried about the impact AI will have on human beings; India wants to be a global innovation garage of AI—will achieve what they are set out to do is anyone's guess. But they have achieved one thing. They have built tremendous 'credible' hype around the area. Credibility is important because hype per se is not such a new thing for the tech community.

All this hype around AI, in this 'use case' era, has resulted in businesses scrambling to embrace AI to make a positive impact to their business. What has turned this hype to a real activity is that the barrier to experiment—why, even implement—is low in case of AI. Contrast that with say, something like Blockchain. It is not for everyone to set aside significant time and resources and quickly stitch together an alliance or ecosystem. AI does not just require lower investment and other resources, it shows quick results; never mind the what-is-real-AI debate.

So, the top executives want to ride the AI wave and make 'an impact'. While a small fraction of those businesses has formulated strategies around AI and analytics and have built up data teams which are taking this up, in most others it is the CIO with whom the buck stops. Even in those businesses where there is a separate data/analytics team, the CIO is often the incubator for the initiatives concerning application in business functions. In more data mature organizations, they are still active collaborators.

In this year's CIO&Leader annual conference in August, seven out of ten CIOs chose AI as the technology that they are most interested in. Yet, when this writer talked to them, many of those who had even implemented AI solutions like intel-

Absentia VR

Edge Networks

Locus

Netradyne

Niki.ai

SigTuple



## Making the Conversation Intelligent!

Most start-ups in our list are working on chatbots, vhabot platforma, building chatbots for specific functions (such as HR) or specific industries (such as financial services).

- |                                       |  |
|---------------------------------------|--|
| ■ Yekaliva (AARC)                     | ■ Morph.ai                               |
| ■ Active.ai                           | ■ Niki.ai (Techbins)                     |
| ■ Avaamo                              | ■ Supertext AI                           |
| ■ Bash.ai                             | ■ Vernacular.ai (different languages)    |
| ■ Brainasoft                          | ■ vPhrase (natural language interface)   |
| ■ Discovery AI                        | ■ Rockmetric (NLP)                       |
| ■ Glib.ai                             | ■ Mihup (Indian language speech to text) |
| ■ Haptik                              |  |
| ■ no-bots (Light Information Systems) |  |

lilent bot by a startup did not even know names of other solution providers beyond the one that they worked with or maybe, one/two more. Surely, they are missing something. Some of these startups—with offices both in India and the US—are working with leading global companies. Not only are they creating solutions with cutting-edge technologies, they have immense understanding of issues in verticals.

That is when we decided to come out with this list. This is a simple list of AI startups who have tangible solutions/services leveraging AI—in various aspects. By no means, they are the only ones.

### What this list is? And what it is not?

First, by design, it is a list of startups. The definition we have used here is: They are ten years or younger. That is, they have started in 2008 or after.

Obviously, we have kept out those that have only B2C solutions.

And finally, a list like this cannot claim to be comprehensive. We will love to be pointed to any significant company that we have missed. This is the beginning of a research on Indian enterprise AI that we have started. This is the very first step.

Is there any information that we have presented not available on Internet? Hardly. We ourselves have used it extensively to gather that info. You will find many top 10, top 22, top 30 AI companies lists—their CEOs name, funding they have received, who are the investors, number of rounds of funding, sometimes where they are based. This information is of little use to an enterprise tech manager looking for a conversational AI solution for retail industry or an intelligent industrial IoT solution.

The scope of the story does not allow us to get into details. All we have done is to help reduce the

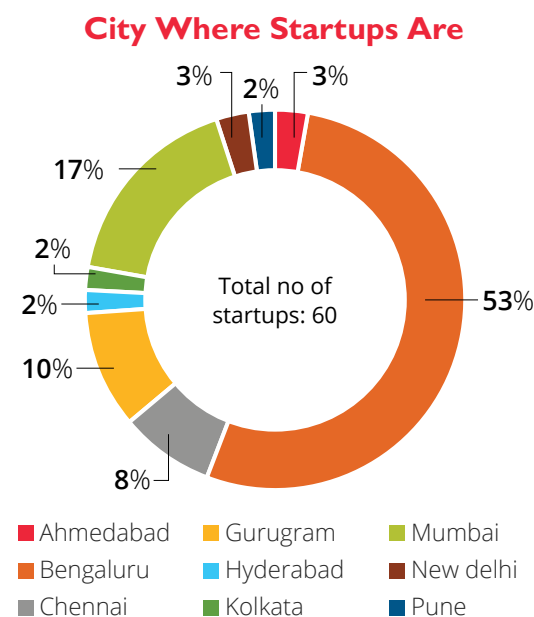
enterprise AI shoppers' list from 60 to seven or three. That is all we promise.

Ours is a curation job for the enterprise tech managers who are looking to work with Indian startups to roll out AI.

### What we found

Before we get into the actual list, here is what we found, based on the analysis of 60 companies that we have listed.

**Bengaluru is still the AI capital.** Talent, conducive environment for entrepreneurship, and presence of VCs make Bengaluru the preferred location for AI startups. More than half the AI startups are based in Bengaluru. With many targeting developed markets, it is no surprise that the Mumbai- and Delhi-based CIOs have not heard about many of them.



Sources: 9.9 Group Research

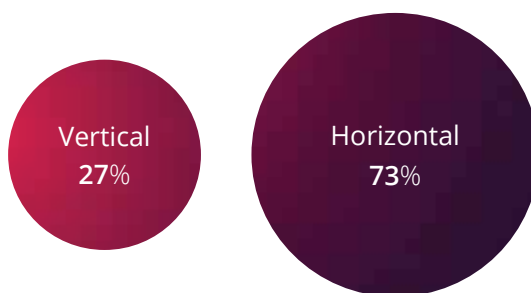
**Most AI players are focusing on horizontal solutions.** Two out of three AI companies are developing solutions that can be used in multiple industries. In fact, except for healthcare, there is hardly any major vertical focused solution. Do not get us wrong. We are not talking of adoption. We are talking of specialized solutions. Financial services and online retail may still use a lot of AI-leveraged solutions but those solutions are largely in areas like customer service or user analytics, that can have use cases in almost any industry, especially B2C. Retail industry, especially online retail, would be a major user of AI but much of that is developed internally.



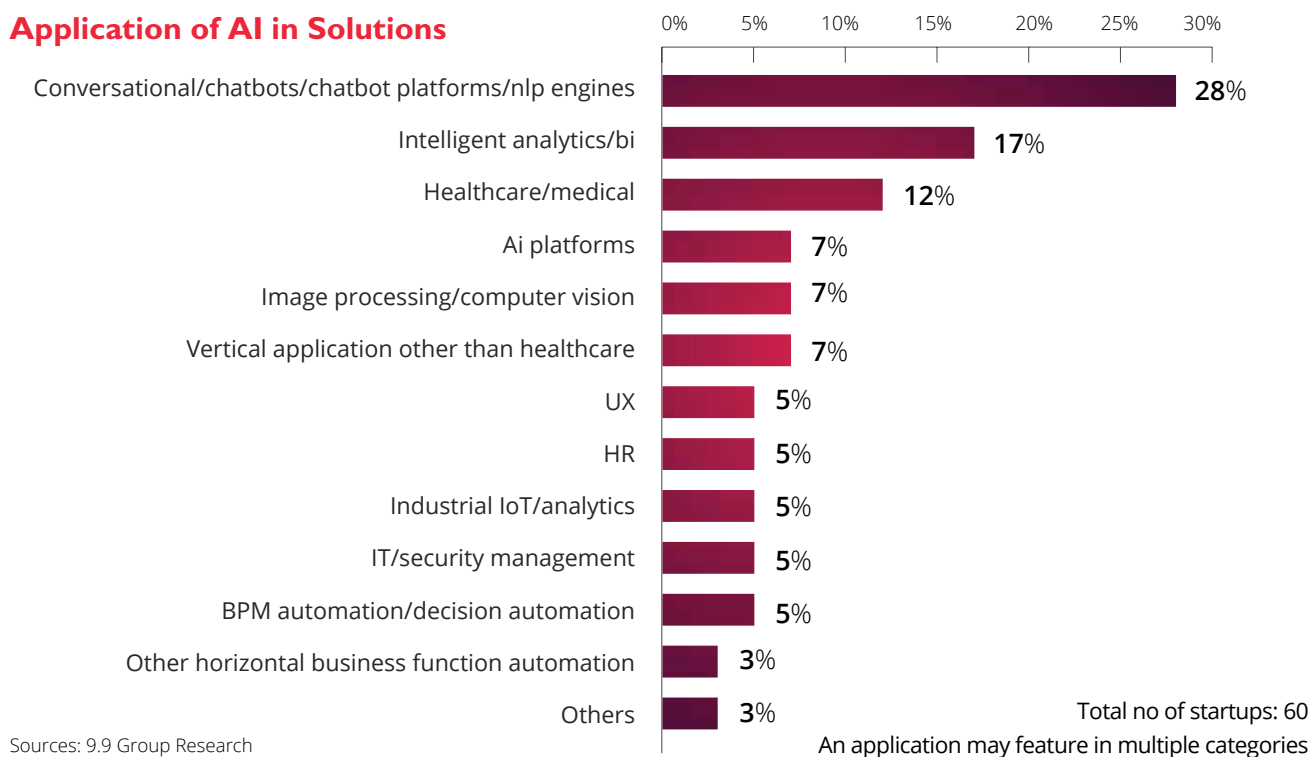
## Horizontal or Vertical?

Total no of startups: 60

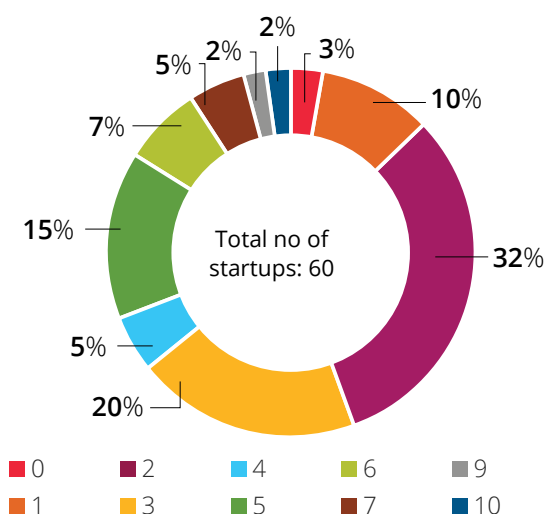
Sources: 9.9 Group Research



## Application of AI in Solutions



## Age of Startups



### Chatbots/Chatbot creation platforms are the most common offerings.

Do not be surprised if many believe AI to be synonymous with chatbots. More than one in four startups are developing conversational products. These include the branded bots, platforms for enterprise to build their bots, natural language processing (NLP) interfaces and similar products. While some are focusing on verticals, others are focusing on functions (like employee communications).

### Most companies are between 1-5 years old.

More than four out of five AI startups are between 1 and 5 years old. In fact, close to two-third of them are three years or younger—that started in or after 2015.

The list is presented with basic information that is of use to enterprises—company, website, year of start-ups, vertical or horizontal, solution category and actual solution. We hope that is enough to start your own focused exploration! ■



# Enterprise AI Solutions Startups in India

Company	Website	City	Start Year
Aarc	Yekaliva.ai	Chennai	2018
Absentia Vr	Norah.ai	Bengaluru	2015
Active.ai	Active.ai	Bengaluru	2016
Agara Labs	Agaralabs.com	Bengaluru	2017
Aindra Systems	Aindra.in	Bengaluru	2012
Artivatic Data Labs	Artivatic.ai	Bengaluru	2016
Arya.ai	Arya.ai	Mumbai	2013
Avaamo	Avaamo.com	Bengaluru	2014
Avanseus	Avanseus.com	Bengaluru	2015
Bash.ai	Bash.ai	Gurugram	2017
Boxx.ai	Boxx.ai	Bengaluru	2016
Brainasoft	Brainasoft.com	Ahmedabad	2013
Coviam	Engati.com/Coviam.com	Bengaluru	2016
Creditvidya	Creditvidya.com	Mumbai	2013
Cruxiq	Cruxiq.com	Chennai	2016
Cuddle.ai (Subsidiary Of Fractal Analytics)	Cuddle.ai	Mumbai	2016
Customersuccessbox	Customersuccessbox.com	Bengaluru	2016
Discovery Ai	Discovery.ai	Pune	2016
Edge Networks	Edgenetworks.in	Bengaluru	2012
Engineer.ai	Engineer.ai	Gurugram	2012
Fabulyst	Fabulyst.com	Bengaluru	2016
Floatboat	Floatboat.ai	Bengaluru	2017
Fluid Ai	Fluid.ai	Mumbai	2008
Flutura	Flutura.com	Bengaluru	2012
Formcept	Formcept.com	Bengaluru	2011
Glib.ai	Glib.ai	Ahmedabad	2013
Haptik	Haptik.ai	Mumbai	2013
Innefu Labs	Innefu.com	New Delhi	2011



Horizontal/Vertical	Product	Solution Description
Horizontal	Yekaliva	Platform For Creating Chatbots
Vertical (Gaming)	Norah	AI-Based Workflow For Generating Games
Vertical (Financial Services)	Triniti	Conversational AI Engine Built Specifically For Financial Services
Horizontal	Agara	Analytics Of Customer Communications For Insights And Predictions
Vertical	Aindra Is	Cervical Cancer Detection System
Horizontal	Av Series	Horizontal AI Engines With Solutions For Multiple Industry Applications
Horizontal	Vega	End-To-End Deep Learning Platform For Data Scientists
Horizontal	Avaamo	Various Components For Conversation Design
Horizontal	Avanseus Cognitive Assistant For Networks	Predictive Maintenance Of Networks
Horizontal	Bash	Chatbots For HR Application
Vertical (E-Commerce)	Boxx.ai	AI Powered UX For E-Commerce
Horizontal	Braina	AI-Powered Virtual Assistant
Horizontal	Engati	Free Chatbot Platform To Build, Train, Integrate Chatbots
Vertical (Financial Services)	Creditvidya	AI-Based Credit Underwriting Automation
Horizontal	Cruxiq	AI-Based Platform For Analyzing Legal Contracts And Summarizing In Natural Language
Horizontal	Cuddle	AI-Based Business Intelligence
Vertical (SaaS Providers)	Customersuccessbox	Automate Customer Onboarding, Product Usage Analysis And User Communication
Horizontal	Discovery Ai	Conversational AI Platform
Horizontal	Hirealchemy	AI Powered Hr Platform For Talent Acquisition, Internal Workforce Optimization And Analytics
Horizontal	Cloudops	AI-Leveraged Tool For Building Custom Software
Vertical (Retail)	Fabulyst	Virtual Salesman For Fashion Stores
Horizontal	Floatboat	Conversational AI Engine
Horizontal	Fluid Ai	Intelligent And Predictive Analytics For Custom Applications
Horizontal (All Manufacturing)	Cerebra	Industrial IoT Platform For Proactive Maintenance
Horizontal	Mecbot	Data Analytics Platform
Horizontal	Glib.ai	Customer Messaging Platform
Horizontal	Haptik	Customer Service And Engagement Platform
Horizontal	Authshield, Prophecy	AI-Based Cyber Security Solution, Video Analytics Solution



# Enterprise AI Solutions Startups in India

Company	Website	City	Start Year
Light Information Systems	Nlpbots.com	Mumbai	2013
Locus	Locus.sh	Bengaluru	2015
Mad Street Den	Madstreetden.com	Chennai	2013
Mihup	Mihup.com	Kolkata	2016
Morph.ai	Morph.ai	Gurugram	2016
My Ally	Myally.ai	Hyderabad	2015
Netradyne	Netradyne.com	Bengaluru	2015
Niki.ai (Techbins)	Niki.ai	Bengaluru	2015
Niramai Health Analytix	Niramai.com	Bengaluru	2016
Noodle Analytics (Noodle.ai)	Noodle.ai	Bengaluru	2016
Peritus.ai	Peritus.ai	Bengaluru	2017
Playment	Playment.io	Bengaluru	2015
Positivenaick Analytics	Positivenaick.com	Chennai	2017
Quantiphi	Quantiphi.com	Mumbai	2013
Qure.ai (Subsidiary Of Fractal Analytics)	Qure.ai	Mumbai	2016
Revarn	Revarn.com	Bengaluru	2015
Rockmetric	Rockmetric.com	Mumbai	2015
Sigtuple	Sigtuple.com	Bengaluru	2015
Smarthealth	Smarthealth.ai	New Delhi	2018
Staqu	Staqu.com	Gurugram	2015
Supertext Ai	Supertext.ai	Bengaluru	2016
Tao The Automation Office	Taoautomation.com	Bengaluru	2016
Ten3t Healthcare	Ten3thehealth.com	Bengaluru	2014
Thirdwatch	Thirdwatch.ai	Gurugram	2016
Tricog Health Service	Tricog.com	Bengaluru	2014
Uncanny Vision	Uncannyvision.com	Bengaluru	2011
Vernacular.ai	Vernacular.ai	Bengaluru	2016
Videoken	Videoken.com	Bengaluru	2017
Vphrase	Vphrase.com	Mumbai	2015
Vue.ai (Specialized Co Of Mad Street Den)	Vue.ai	Chennai	2016
Xurmo	Xurmo.com	Bengaluru	2009
Zenatix (Subsidiary Of Hero Electronix)	Zenatix.com	Gurugram	2013



Horizontal/Vertical	Product	Solution Description
Horizontal	Hr Assist	Employee Conversational Bot
Horizontal	Multiple Products	AI-Based Supply Chain Decision Making Engine
Horizontal	Mad Street Den	AI Platform And Tools (See Vu.ai)
Horizontal	Mihup	Indian Language Text To Speech Solutions For Multiple Applications
Horizontal	Morph.ai	Conversational Marketing Chatbot
Horizontal	Myally.ai	AI-Based Recruiting Solution
Horizontal	Driveri	AI-Based Commercial Vehicle Safety And Monitoring Solution
Horizontal	Niki.ai	AI-Based B2C Chatbot Which Brands Can Leverage
Vertical (Healthcare)	Niramai	Breast Cancer Detection System
Horizontal	Beast	AI-Based Big Data Analytics Platform
Horizontal	Peritus	Data Center Automation Using AI
Horizontal	Playment	Computer Vision, With Driving Automation Applications
Horizontal	Na	Services
Horizontal	Quantifi	Computer Vision, Natural Language Processing
Vertical (Healthcare)	Qure.ai	Multiple Healthcare Solutions Using AI
Horizontal	Multiple	Multiple AI Tools Including Bot Platforms
Horizontal	Rockmetric	Cognitive Data Analytics With Natural Language Search
Vertical (Healthcare)	Sigtuple	Visual Analytics Of Medical Data
Vertical (Healthcare)	Smarthealth	AI-Powered Analytics Solution For Hospitals
Horizontal	Abhed	AI Based Human Efface Detection
Horizontal	Chatclay	Chatbot Platform
Horizontal	Tao	RPA For Business Process Management
Vertical	Cicer	Preventing Healthcare Using Wearables To Monitor
Vertical (E-Commerce)	Mitra	AI-Based Fraud Detection For E-Commerce Companies
Vertical (Healthcare)	Tricoginstaecg	AI-Powered Instant ECG Solution
Horizontal	Uncanny	Embedded Deep Learning System
Horizontal	Vernacular AI	Multilingual Chatbots
Horizontal	Videoken	Intelligent Video Players
Horizontal	Phrazor	Natural Language Based Bi
Vertical (Retail)	Vu.ai	AI-Based Retail Automation
Horizontal	Xurmo	Big Data Analytics Platform
Horizontal	Wattman	Intelligent IoT-Based Solution For Energy Management





# Transformation Will Become Pragmatic: Forrester

Forrester has come out with its 2019 predictions.

In 2018, the theme for CIO&Leader's annual Summit was Practical CIO. The Forrester 2019 forecasts validate that. Multiple predictions point to a shift towards organizations moving from generic to specific; from concepts to practical interventions. Here are the 12 forecasts:

## 1. CX remains under fire

20% of brands will give up on strategic CX initiatives and resort to price reduction for short-term gains.



Forrester says customer experience performance is flat for the third year in a row and 89% of surveyed CX professionals say ROI of CX is not well established in their companies.

“There is a strategic and structural mismatch between what CX needs to do and what CX is allowed to do or is capable of doing. 2019 will see that mismatch continue to play out,” says Forrester.

## 2. Digital goes surgical

25% of firms will decelerate digital efforts altogether and lose market share.

Indians are just too familiar with the term. Forrester says in 2019, digital transformation in enterprises will move from grand organization-wide plans to more pragmatic, specific initiatives aimed at “making incremental and necessary changes to operations”.

“Tangible efforts, such as shifting customers to lower-cost digital channels, launching digital products, monetizing data assets, and automating processes to improve margins, will come to the fore,” observes Forrester.

## 3. Purpose regains meaning

20% of brands will refine and revitalize purpose.

Another aspect of the move to tangible is refocusing on purpose.

“2019 will be a year in which transformational ideals translate to pragmatic actions. Leaders will make hard choices as to what is truly strategic and what is the basis for bolder strategies in 2020 — while preparing for a possible economic downturn. Purpose will be the essential ingredient, acting as the strategic compass or the rudder in the storm,” says Forrester.

## 4. CMOs rebrand

More than 50% of CMOs will bring brand back as their top priority.

“In 2019, CMOs will move more budget and attention to remaking or

revitalizing the brand. Some will take the added step of reaffirming and honing purpose as an internal engine to re-establish (or, in some cases, merely establish) the connection among their firm’s purpose, brand, and experience,” says Forrester.

However, CMOs returning to basics, warns the research firm, “could be a double-edged sword, as some CMOs could be perceived as retreating to their comfort zone of brand building and avoiding the hard task of driving and orchestrating strategic and operational change.”

## 5. CIOs take the reins

25% of CIOs will expand their remit.

the CIO — will lead and orchestrate this vital effort; CIOs will spend the time to build their leadership teams, empowering trusted operators to handle much of the day-to-day. Arguably the most important outcome of 2019 is that leading CIOs will build a model that translates tech-led innovation into customer value,” it says.

## 6. AI builds a foundation

RPA and AI will join forces to create digital workers for more than 40% of enterprises.

In 2018, says Forrester, three items held AI back.

- AI had insufficient information

25% of firms will decelerate digital efforts altogether and lose market share... digital transformation in enterprises will move from grand organization-wide plans to more pragmatic, specific initiatives aimed at “making incremental and necessary changes to operations”

The rest will be relegated to a trusted operator.

“In 2019, more CEOs and CIOs will come to terms with the scope and interdependence of this mandate — and the criticality of its success to the very destiny of their companies. They will agree that one executive —

architecture.

- AI was too horizontal.
- AI was too confusing.

In 2019, firms will put more potent building blocks in place to accelerate their ability to meet AI’s extraordinary promise, it says.



## 7. The world goes to Zero (Trust)

One major brand will lose valuation of more than 25% due to a cyberattack.

"In 2019 and into 2020, Zero Trust will become the ad hoc standard in the US, adopted by the US government as both its preferred strategy and as inferred guidance to industries. US government adoption will trickle down to industries by following a similar path to the Cybersecurity Framework. It will be more like a healthy waterfall as CISOs and CIOs amp up their ability to play defense in a hostile world," says Forrester.

## 8. Consumer brands enter the outrage

75% of B2C CMOs will be tempted to jump into the social fray; 50% of those efforts will fail.

Like individuals, brands will take sides in the social media debates.

In 2018, some brands jumped into the fray; Nike is the best example — a company that understands the overriding sentiments of its customer base.

In 2019, more brands will be tempted to jump into market-baiting — taking sides to score points. But most don't have the analytics or instincts to get the timing and tone right. Those firms will misjudge the moment and mechanics to do this well and to make an impact, says Forrester.

## 9. B2B in a squeeze

33% of B2B CMOs will shift away from blunt outbound methods and reorient around customer outcomes.

"In 2018, we saw CMOs and B2B marketers mostly make do with what they had — choosing to optimize for lead flow versus marrying CX with marketing to take on the broader mandate of growth. Some made inroads by advancing early- and late-stage engagements — but most stayed true to supply-side marketing. Something has got to give, as old-school tools and approaches are unable to support the growth mandate.



More brands will be tempted to jump into market-baiting — taking sides to score points. But most don't have the analytics or instincts to get the timing and tone right.

In 2019, 33% of progressive B2B CMOs will drive change, shifting away from blunt outbound methods to reorienting around

customer outcomes. They will take a portfolio approach to microsegments as a first big step to individualization.

## 10. EX takes center stage

85% of employee experience measurement efforts will fail.

## 11. Robots reimagine talent management

25% of leaders will use automation to address the talent scarcity squeeze.

"In 2019, talent leaders will start to execute two interrelated strategies centered on a robotics quotient (RQ) and a good-to-great hiring and development strategy," says Forrester.

## 12. VC funding recalibrates

VC funding for martech and adtech will drop by 75%.

## 13. Blockchain exposes advertising

By the end of 2019, more than 50% of the top 100 advertisers will use blockchain for supply chain transparency.

"In 2019, blockchain — better described as distributed ledger technology — will chip away at digital advertising's opacity problem. Large brands are in blockchain pilot programs now; by the end of 2019, they will have a better understanding of where waste and abuse lie and how their money is spent," says Forrester.

## 14. IoT gets down to business

85% of firms will implement or plan to implement IoT solutions.

"B2B applications of the technology are set to take off in 2019," says Forrester.

"B2B IoT will focus on driving efficiencies, connecting the enterprise, expanding the edge, and, in some cases, providing personalized customer experiences," predicts Forrester. ■



# डिजिट अब हिंदी में

देश का सबसे लोकप्रिय और विश्वसनीय टेक्नोलॉजी वेबसाइट डिजिट अब हिंदी में उपलब्ध हैं। नयी हिंदी वेबसाइट आपको टेक्नोलॉजी से जुड़े हर छोटी बड़ी घटनाओं से अवगत रखेगी। साथ में नए हिंदी वेबसाइट पर आपको डिजिट टेस्ट लैब से विस्तृत गैजेट रिव्यू से लेकर टेक सुझाव मिलेंगे। डिजिट जल्द ही और भी अन्य भारतीय भाषाओं में उपलब्ध होगा।



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डिजिट





## IBM's Red Hat Deal – What Changes For The CIO?

If IBM decides to switch largely to an integration role in a multi-cloud environment, powered by Red Hat solutions, it will be great news for enterprises. But will it do that?

By Shyamanuja Das

**T**he analyst community has already given a thumbs-down to the IBM-Red Hat deal. One analyst has famously called it a 'desperate deal'. After falling behind Amazon, Microsoft and Google in the public cloud race, IBM needed to do something to keep itself relevant.

While championing 'hybrid' was the logical position to take for IBM, there was very little to show. Theoretically, it either had to do something significant in the public cloud space to break into the league or enhance its private cloud/integration offering. With no practical way of achieving the former, it had no choice but to build a good differentiation in the latter, especially to thwart competitive threat from the likes of HPE and Oracle.



If an acquisition is indeed the answer, there was no better target than Red Hat. If the analyst community is questioning it, then it is on two points.

### Is it too big or too late?

Many question the price that IBM is paying—a whopping USD 34 billion, almost 60% premium on the price at which Red Hat was trading. Not just that, some other terms have also worried the investors. One such is that IBM would pay Red Hat a billion if the deal fails to materialize.

The other big question is if it is too late to make an impact to IBM. Has it already lost the plot?

Let us leave both the questions for a moment and try to examine if and how IBM can turn around using Red Hat in its arsenal—something that is relevant for CIOs.

One thing is for clear. It was not an option for IBM to join as the fourth or fifth—Alibaba is almost as big, though restricted to APAC—public cloud player trying to catch up. Rather, it needed to do something around which its credibility can logically be—and to some extent, is—a bit higher—the hybrid game, that is becoming the prime cloud go-to for enterprises (more than half the cloud users have a hybrid approach, according to RightScale's State of the Cloud 2018 report).

The same report says that organizations are increasingly going for multiple cloud providers. Almost 81% of organizations have a multiple cloud strategy.

Red Hat solutions are uniquely positioned to support that kind of enterprise strategy. Take OpenShift, its Linux container software. It can enable IBM to help enterprises migrate workloads between multiple clouds.

IBM CEO Ginni Rometty acknowledged as much when she called Red Hat “the world's leading provider of open-source cloud solutions, and the emerging leader in the platforms for hybrid cloud and multi-cloud.”

While that sounds nice and is true, from a pure product-technology standpoint, much will depend on how

IBM maintains the neutrality of Red Hat, which has strong partnerships with all top cloud providers. Rometty too acknowledged that when she said Red Hat's “Switzerland-like” position would be maintained.

For the CIOs, who have been IBM customers for years but were switching to cloud, would be comfortable if IBM offered the services. It may be

consulting/integration partner for AWS and Google which do not have such capability, getting to a new round of IBM-Microsoft rivalry.

That would be good news for CIOs.

Those who are speculating that other cloud players like ServiceNow, Pivotal, Zscaler, Okta, Ellie Mae and Twilio would now be pursued are stretching things a bit too far. It is not

From a pure product-technology standpoint, much will depend on how IBM maintains the neutrality of Red Hat, which has strong partnerships with all top cloud providers



noted here that more and more customers of both hyperscale and smaller cloud providers are turning to services partners for integration, especially in case of multiple cloud providers.

Can IBM aspire to be the top such integrator? If it does, with the help of Red Hat portfolio, it may not help its short-term revenue much (why, it may cannibalize the public cloud business a bit) but it could be a big game changer for cloud.

Extending that, IBM may just be the

Red Hat which badly needed IBM; it is the other way. Which other company could make that investment? Maybe HPE.

However, all these discussion—including ours here—ignores one big thing that Red Hat has got, its huge customer base, especially in the public sector and government, though for its traditional enterprise Linux platforms. Bombay Stock Exchange, GSTN, Aadhaar, LIC all run on Red Hat Linux. They are great entry points■





# Securing E-Procurements Through Digital Signatures

For e-tenders, digital signatures play a crucial role, as a prospective vendor cannot at a later stage deny submitting a bid with certain prices or submitting certain information during the pre-qualification stage

By Ved Prakash

In today's times, technology evolves real fast...the flip side, so do hackers. Armed with a deviously brilliant mind and superior knowledge of the latest technologies, hackers are breaching organization's cybersecurity with such surprising ease that's its worrisome.

The latest victim of a sophisticated cyber fraud has been the Madhya Pradesh (MP) government. Dubbed as the 'e-tender scam', the fraud involved large-scale manipulation of the government's e-procurement platform to rig the bids in favor of a select few private companies. Fraudsters breached the e-procurement platform to check the bids quoted by various vendors and modified the bids of the companies of their choice to the lowest.



## How did this happen?

The scam came to light in March this year, when the Madhya Pradesh Jal Nigam (MPJNL) was notified by an internal report that the bidding data submitted by vendors was being modified in collusion with some insiders and a few private companies.

The internal inquiry revealed that the bids for rural water supply schemes had been altered to make three favored companies the lowest bidders. The bids of other vendors were illegally made available to these bidders so they could lower their bids and seal the deal.

## How was the scam unearthed?

Investigators conclude that the use of Digital Signatures (also known as Digital Signature Certificates or DSCs) and Encryption Keys played a pivotal role in unearthing the scam.

To ensure optimal security and transparency in the bidding process, the MP government's e-procurement platform mandated that a vendor's bidding data should be encrypted using the DSC of the Tender Opening Authority (TOA) and decrypted using the TOA's encryption certificate keys.

When the bids of the submitted tenders were opened, the platform instantly highlighted a mismatch in the One-Way Hash (OWH) value of the vendor's bid document. This, in turn, resulted in the 'signature verification' page showing an error in 'signature and certificate validation status', thereby indicating that the original bid data was modified at a later stage by an unauthorized person.

The OWH (a mathematical algorithm that indexes data of arbitrary size) that was generated at the time of submitting the bid was different from the tampered OWH, which indicated that the document content had been altered.

## How Digital Signatures make e-Procurements safer

In today's times, many organizations strive to transform into a paperless

office to improve their efficiency and reduce operational costs.

In a paperless environment like this where most documents, especially confidential documents like tender bids, contracts, etc., are stored in an electronic format, adopting a Digital Signature-based approach can help organizations in many ways. Below are three significant benefits:

### Authentication

When it comes to submitting bids for e-tenders, prospective vendors submit a lot of confidential information like their company's financial information, personal information of the directors and other senior personnel, name and contact details of their clients for reference checks, bid amount, etc.

To get an undue advantage over others, competing vendors would definitely like to access such confidential information. They usually obtain this information in connivance with insiders who have a direct access to it. As seen in the MP e-tender scam, once such information is accessed, the original bid documents can be modified to get an upper hand in the bidding process.

The use of Digital Signature is perhaps the most certain way to prevent such manipulations. Since the ownership of a Digital Signature Key is bound to a specific user only, a 'valid signature' notification guarantees that the document was sent by that user only.

### Integrity

In many scenarios, the sender and receiver of a document need assurance that the document has not been altered in any way during transmission. Digital Signatures provide this feature by using cryptographic 'message digest' functions that contain a string of digits created by a one-way hashing formula.

As seen in the case of the MP e-tender scam, any alteration in the original document gets instantly highlighted due to a mismatch in the

**Digital Signatures ensure that the sender who has signed any document cannot at a later stage deny signing it. For e-tenders, this feature plays a crucial role**

OWH value of the original document and its altered version.

### Non-repudiation

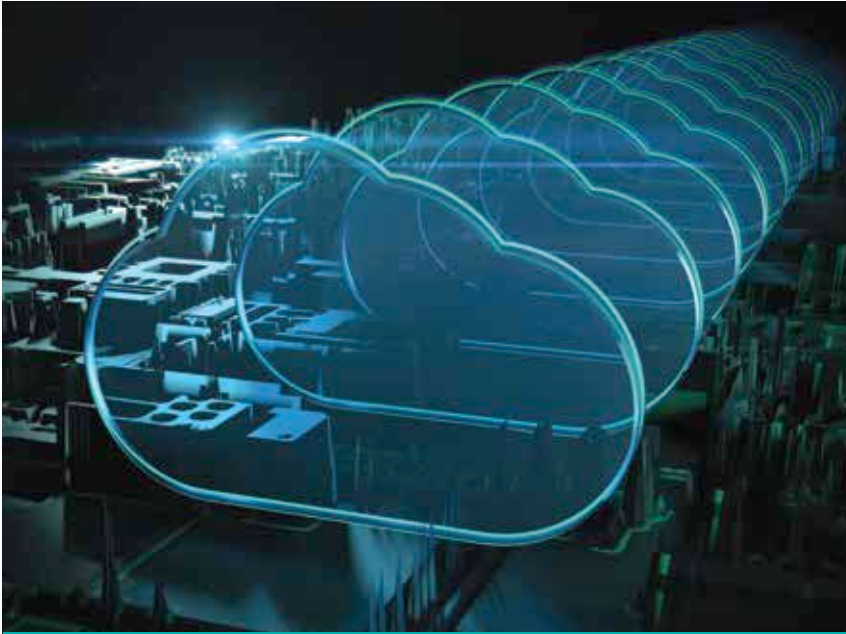
Digital Signatures ensure that the sender who has signed any document cannot at a later stage deny signing it. For e-tenders, this feature plays a crucial role, as a prospective vendor cannot at a later stage deny submitting a bid with certain prices or submitting certain information during the pre-qualification stage.

As organizations shun paper-based processes and embrace digital practices like e-procurements, it is crucial that they implement robust cybersecurity measures to avoid breaches.

With an increasing number of procurement teams storing a chunk of proposals, contracts and other commercial documents in the digital format for ease of access, the need of the hour to prevent cyber frauds, is to adopt digital signing to verify the authenticity of such documents and use HSMS to ensure zero-compromise of the sensitive digital signatures■

*The author is Senior Business Development Manager, India and SAARC Region, Gemalto*





# Majority Of Indian Organizations Still In Early Stages Of Cloud Maturity: Study

More than 14% of the organizations are in the latter stages of maturity in the Asia/Pacific (excluding Japan) markets

**M**ore than 93% of the Indian organizations are still in the early stages of maturity, according to IDC India's latest study, titled 'IDC MaturityScape Benchmark: Cloud in India, 2018'. These in IDC MaturityScape's model are referred to as ad hoc and opportunistic stages. Compared to the Asia/Pacific (excluding Japan) markets, with more than 14% of the organizations in the latter stages of maturity (repeatable, managed, and optimized), Indian organizations in the latter stages are lesser (10%).

While improving IT security and increasing business agility remain among the top expected benefits of cloud by Indian enterprises, the challenges related to costs and complexities with infrastructure cannot be ignored. To be able to derive maximum business value from their investments in cloud, awareness around potential benefits and challenges is a must.

"Most organizations in India have plans to spend maximum of their new cloud

spending on SaaS applications over the next year," says Rishu Sharma, Associate Research Manager, Cloud and Internet of Things (IoT), IDC India. "Organizations in India are looking for providers with deep technological expertise, along with experience across verticals, that can help them transform their businesses, providing them with business agility and increased IT security."

The IDC MaturityScape specifically defines the stages, critical measures, business outcomes, and actions that are required to effectively move through the stages and increase value as more investments are made. Using the maturity measures and descriptions in the document, organizations can:

- Understand exactly what sets "thriving" organizations apart from "surviving" organizations, based on their maturity scores
- Understand industry and peer group expectations for business outcomes and IT outcomes for an increasingly mature (sophisticated) use of cloud in how organizations operationalize their internal IT assets and how they source capability on the public (provider-based) cloud
- Understand the supporting processes, governance models, technologies, and skills to deliver cloud-based service delivery models to their internal customers
- Identify gaps in overall cloud management capabilities based on the aforementioned criteria - or more broadly, vision, technology, people, and process

"While organizations in India understand the need for incorporating cloud technologies in their digital journey, they will have to move from experimentation to active adoption, ensure scale and swiftness for better leverage. 'The Cloud Journey' is a mandatory one for all organizations and there is a need to take intelligent decisions to be able to progress rapidly in the maturity curve" says Ranganath Sadasiva, Director, Enterprise Infrastructure, IDC India■





# Enabling Employees To Change Jobs Within Their Organization Can Increase Their Likelihood To Stay: Gartner

Increased competition in the external labor market is making it harder for organizations to attract new candidates and retain their best talent

Increased competition in the external labor market is making it harder for organizations to attract new candidates and retain their best talent, according to Gartner. This is compounded by today's historically low unemployment rates, which have put pressure on traditional talent management strategies, and mean that it is taking longer and costing more to hire critical talent.

To combat this challenge, Gartner experts said there are benefits to creating a more vibrant internal labor market, including a 27% increase in employee willingness to go above and beyond at work and a 33% increase in employee intent to stay. Managers report internal hires perform better than externals across a whole range of measures, such as attendance, collaboration and meeting



expectations, which add up to 10% fewer regretted hiring decisions.

Gartner's 2Q18 *Global Talent Monitor* report found that lack of future career opportunities was the top driver of employee attrition in every major economy, as well as globally. This echoes Gartner data from 2017, when 41% of employees who left their organization cited lack of future career opportunity as the No. 1 reason, ahead of compensation (36%) and the people management (34%).

Organizations are competing for talent now more than ever before. According to Gartner TalentNeuron, in 2017, 90% of S&P 100 companies recruited for the same 37 roles. While heads of talent management are recognizing that higher levels of internal mobility can alleviate these pressures, they are largely unable to achieve the results they desire.

### What's going wrong?

There are three fundamental barriers facing employees who might want to participate in their internal labor markets:

■ **Visibility:** It is hard for employees to know what opportunities are available to them in their own organizations.

Just more than one-quarter of employees believe that their organizations make it easy for them to find job opportunities that match their interests.

■ **Cultural norms:** The cultural norms that exist in most organizations today fail to support the idea of employees moving across the organization. Only 37% of managers encourage their direct reports to seek internal opportunities and only 21% of employees believe that it is easy to change positions within their current employer.

■ **Skills:** When employees do find internal opportunities that match their interests, many lack the skills required to fill those jobs. Just 6% of heads of learning and development, and more than one-third of managers, believe that the employees in their organizations have the skills needed for future roles.

### How to make it work

The most progressive talent management leaders recognize that creating an internal labor market requires developing the processes, norms and infrastructure that facilitate the mobility of employees from their current roles to other existing or newly created roles within the organization. To achieve this, they are focusing on three key initiatives:

**1. Push the right jobs to employees.** Leading organizations are using the same technology and tools they use for the external marketplace with their own employees — to actively push a tailored set of jobs that are most in line with their experience and interests.

**2. Ease the path to participation.** Organizations are experimenting with different methods to remove the barriers to participation in their internal labor market. For instance, separating performance discussions and career development discussions.

**3. Brokering employee development.** Rather than simply offering self-service learning platforms, which often overwhelm employees, the best organizations are providing structured guidance on identifying the right internal career options for them and how to achieve them.■



**The most progressive talent management leaders recognize that creating an internal labor market requires developing the processes, norms and infrastructure that facilitate the mobility of employees from their current roles...**





# APAC Ahead Of US And EMEA In Security Policy Automation: Study

APAC is substantially ahead in using AI/ML in production as compared to the US and EMEA where the rate of adoption is still in early days, with few organizations using AI/ML in production — just 4% of respondents in EMEA, 9% in the US

**A**PAC is ahead of the US and EMEA in terms of automation for processes involved in the management of firewall rules and security policy, according to the results of a global survey conducted by Osterman Research, *Understanding Security Processes and the Need to Automate*. The survey, which includes responses from 465 senior security leaders at large enterprises in the US, EMEA and APAC, reveals trends in the use of security automation, as well as artificial intelligence (AI) and machine learning (ML). Survey questions focused on workflows in firewall and security policy management and vulnerability management.



APAC is substantially ahead in using AI/ML in production as compared to the US and EMEA where the rate of adoption is still in early days, with few organizations using AI/ML in production — just 4% of respondents in EMEA, 9% in the US. “Many organizations have significant deficiencies with regard to their firewall and security management,” said Michael Osterman, Principal Analyst of Osterman Research. “Most realize that they need to improve the

network context and having visibility of firewall and security policy, including why firewall rules exist. 47% in APAC said they had only “minimal or some understanding.” 39% in APAC said they have only minimal or some understanding of how security changes impact their business: And it appears that identifying vulnerabilities continues to be a challenge, with 42% in APAC having only minimal or some understanding of what vulnerabilities exist on network devices.

for many companies, migration to the cloud is having a significant impact on the automation of security policy changes. This is most notable in APAC where 43% of organizations said cloud is impacting the automation of security policy changes. Survey results also show that the clear majority of organizations are working on initiatives focused on security automation to support cloud environments.

While the journey to understand the key drivers for Security Automation

It appears that identifying vulnerabilities continues to be a challenge, with 42% in APAC having only minimal or some understanding...



way they manage security and policy, and they also realize that automating workflows and processes is key to these improvements.”

A few interesting trends from the survey:

■ **Cost is critical but not for APAC, only 35% in APAC ranked costs as the key driver for automation.**

They instead ranked the difficulty of managing the size and complexity of their network as the primary reason (43%), as well as being able to move skilled staff off mundane activities to higher value/skill security tasks (40%).

■ **Better visibility and context are still one of the key concerns when it comes to APAC.** Organizations are still deficient in understanding

■ **Security staff are bogged down** with incident response processes, compliance management and making changes to the security infrastructure. Compliance management and security changes were noted as the top time takers for APAC.

■ **Security teams need help,** with most organizations admitting they need to make major improvements in how they manage security and policy. The biggest improvements are needed in how organizations decommission applications: 54% in APAC say they do it “poorly or moderately.” Ironically, these are areas where automation can make a huge impact.

■ **Automation is an impetus for cloud migration.** It’s no surprise that

continues, the good news is that security leaders have started on their automation journey. “Security leaders are facing a tough time balancing organization risk and value from automating. Though there are many areas, where it is essential to implement automation — and, in fact, where automation reduces risk. For example, collecting/gathering data for attack surface visibility and modeling, network change management and rule life cycle management. Networks are simply becoming too large and complex to manage manually,” said Gerard Sillars, VP-APAC, Skybox Security. If you’re not already working with a vendor in these areas, you should start looking for one ■





## Security Solution Revenues In APeJ To Rise In 2022: IDC

Asia/Pacific excluding Japan (APeJ) spending on security related hardware, software and services will reach USD 28.76 billion in 2022 with a compound annual growth rate (CAGR) of 20.7% over the forecast period 2017-22

Asia/Pacific excluding Japan (APeJ) spending on security related hardware, software and services will reach USD 28.76 billion in 2022 with a compound annual growth rate (CAGR) of 20.7% over the forecast period 2017-22, according to IDC *Worldwide Semiannual Security Spending Guide*. Security spending is estimated to reach USD 13.41 billion this year, an increase of 19.6% against 2017.

Security-related services will be both the largest (USD 5.3 billion in 2018) and the fastest growing (23.3% CAGR) category of APeJ security spending. Managed security services will be the largest segment within the services category, delivering almost 45 to 50% of the technology category total in



2022. Integration services and consulting services will be responsible for most of the remainder. Security Hardware is the second-largest category with spending expected to total USD 4.9 billion in 2018. Network security hardware will be the largest hardware segment throughout the forecast period, followed by data security hardware. Most of the spend in network security hardware is led by Unified Threat Management and Firewall technology hardware. Software spend will reach USD 3.1 billion in 2018 with a five-year CAGR of 14% only.

Banking will make the largest investment in security solutions, growing double-fold from USD 2.1 billion in 2018 to USD 4.5 billion in 2022. Security-related services, led by managed security services, will account for more than half of the industry's spend throughout the forecast. The second and third largest industries in year 2018, which are

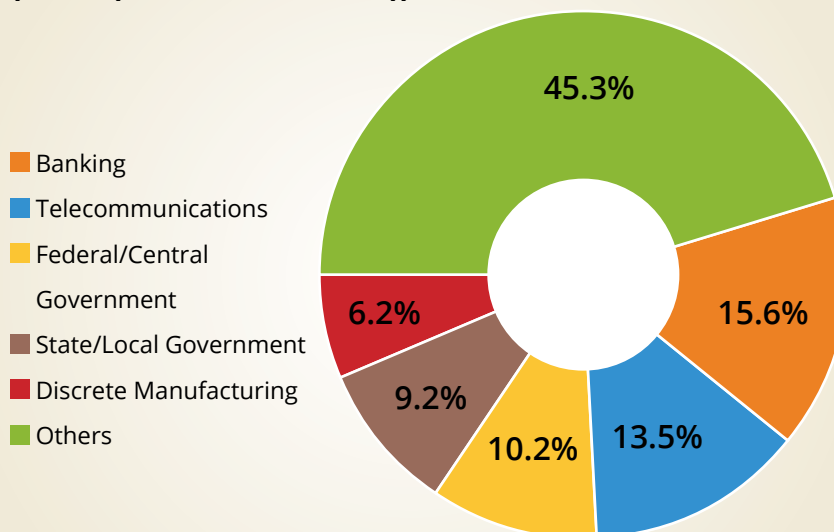
**Hardware is the second-largest category with spending expected to total USD 4.9 billion in 2018. Network security hardware will be the largest hardware segment throughout the forecast period, followed by data security hardware**

discrete manufacturing and federal/central government (USD 1.8 billion and USD 1.3 billion in 2018, respectively) are led by Hardware technology group. The industries that will see the fastest growth in security spending will be Resource Industry (24.2% CAGR), state/local government (24% CAGR), and Utilities (22.9% CAGR).

From a company size perspective, large and very large businesses (those with more than 500 employees) will be responsible for nearly two thirds of all security-related spending in 2018. Small businesses (10-99 employees) will see the strongest spending growth of 21.5%, which will be neck to neck growth with 21.4% in very large businesses (1000+ employees) and 21.3% in large businesses (500-999 employees) over the forecast period. Small offices (1-9 employees) and medium size businesses (100 to 499 employees) will also experience moderately good growth of 20.3% and 19.8% respectively.

From a geography perspective, IDC counts two sub regions under APeJ, which are China and Rest of Asia Pacific (excluding Japan & China). China will only account to 39.7% of total APeJ security solutions spend in 2018 but will gain traction by year 2022 by accounting to almost 50% of total APeJ market. China will show a record five-year CAGR of 26.6% as compared to 16.2% recorded by Rest of APeJ region. Telecommunications and State/Local Government are the two leading drivers of Chinese market for security related solutions, collectively accounting to 35% share from overall China spend in 2018. Industrial spend in APeJ (excluding China) will be led by strong demand in India, Singapore and Malaysia■

**Top Industry Based on 2018 Market Share (Value(Constant Annual))**



Source: IDC Worldwide Semiannual Security Spending Guide, 2017H2



# SD-WAN Deployments Increase But Networking And Security Challenges Remain

Organizations in India with SD-WAN in their organization saving USD 1.15 million on MPLS and networking costs over 12 months

concern for an overwhelming majority of IT leaders as they consider upgrading to an SD-WAN solution. Highlights include:

- 1.** Networking challenges are common with current WAN setups.
  - Top three challenges in India are performance between locations (64%), rapid network expansion (60%), and complexity (55%).
- 2.** SD-WAN deployments are on the rise.
  - In India one-third (37%) have already deployed SD-WAN in most of their sites, and 40% are in the process of doing so or will in the next year.
  - 78% of IT leaders in India said they experienced increased network security since deploying SD-WAN
- 3.** Security is a top priority when choosing an SD-WAN solution.
  - Over three quarters (78%) of respondents in India agree that they don't need to invest in any other security as their SD-WAN solution contains everything required
- 4.** SD-WAN offers improved security and lower costs.
  - Organizations in India with SD-WAN in their organization or in their sights estimate a saving of USD 1.15 million on MPLS and networking costs over 12 months, as a result of implementing SD-WAN

"These findings show that as IT professionals increasingly turn to SD-WAN to address their networking challenges, they're looking for solutions that provide security, simplicity, and cost savings," said Klaus Gheri, VP, Network Security, Barracuda. "Barracuda meets those needs by offering a single solution combining advanced security and SD-WAN."

With secure SD-WAN and advanced security, Barracuda CloudGen Firewalls are an all-in-one solution that can be deployed on-premises as a physical or virtual appliance or in the cloud, redefining the role of a firewall and helping customers optimize distributed networks■

**A** new global research report by Barracuda Networks, "Security, Connectivity, and Control: The Challenges and Opportunities of SD-WAN" surveyed IT leaders and networking and security professionals to learn how widespread SD-WAN deployments are, how organizations are deploying them, and what benefits and challenges they're seeing. Overall, the study indicates that SD-WAN deployments are increasing to address networking challenges resulting from the explosive growth of WAN traffic due to high demand for cloud applications and services. Security remains a top



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# Key Digital Disruptions CIOs May Not See Coming: Gartner

Quantum computing, real-time language translation and nanotechnology are some of the key disruptions which need to be considered

Organizations may not be prepared for key digital disruptions, which include several categories of disruption, each of which represents a significant potential for new disruptive companies and business models to emerge, according to Gartner.

## Quantum Computing

Quantum computing (QC) is a type of non-classical

computing that is based on the quantum state of subatomic particles. Classic computers operate using binary bits where the bit is either 0 or 1, true or false, positive or negative. However, in QC, the bit is referred to as a quantum bit or qubit. Unlike the strictly binary bits of classic computing, qubits can represent 1 or 0 or a superposition of both partly 0 and partly 1 at the same time.

Superposition is what gives quantum computers speed and parallelism, meaning that these



computers could theoretically work on millions of computations at once. Further, qubits can be linked with other qubits in a process called entanglement. When combined with superposition, quantum computers could process a massive number of possible outcomes at the same time.

### **Real-Time Language Translation**

Real-time language translation could, in effect, fundamentally change communication across the globe. Devices, such as translation earbuds and voice and text translation services can perform translation in real-time, breaking down language barriers with friends, family, clients and colleagues. This technology could not only disrupt intercultural language barriers, but also language translators as this role may no longer be needed.

### **Nanotechnology**

Nanotechnology is science, engineering and technology conducted at the nanoscale — 1 to 100 nanometers. The implications of this technology are that the creation of solutions involves individual atoms and molecules. Nanotech is used to create new effects in materials science, such as self-healing materials. Applications in medicine, electronics, security and manufacturing herald a world of small solutions that fill in the gaps in the macroverse in which we live.

### **Swarm Intelligence**

Digital business will stretch conventional management methods past the breaking point. The enterprise will need to make decisions in real time about unpredictable events, based on information from many different sources (such as Internet of Things [IoT] devices) beyond the organization's control. Humans move too slowly, stand-alone smart machines cost too much, and hyperscale architectures cannot deal with the variability. Swarm intelligence could tackle the mission at a low cost.

Swarm intelligence is the collective

## **The cloud platform providers realize (to varying degrees) that they must remove as much friction as possible in the buying and owning of processes**

behavior of decentralized, self-organized systems, natural or artificial. A swarm consists of small computing elements (either physical entities or software agents) that follow simple rules for coordinating their activities. Such elements can be replicated quickly and inexpensively. Thus, a swarm can be scaled up and down easily as needs change. CIOs should start exploring the concept to scale management, especially in digital business scenarios.

### **Human-Machine Interfaces**

Human-machine interface (HMI) offers solutions providers the opportunity to differentiate with innovative, multimodal experiences. In addition, people living with disabilities benefit from HMIs that are being adapted to their needs, including some already in use within organizations of all types. Technology will give some of these people "superabilities," spurring people without disabilities to also employ the technology to keep up.

For example, electromyography (EMG) wearables allow current users who would be unable to do so otherwise to use smartphones and

computers through the use of sensors that measure muscle activity. Muscular contraction generates electrical signals that can be measured from the skin surface. Sensors may be placed on a single part or multiple parts of the body, as appropriate to the individual. The gestures are in turn interpreted by a HMI linked to another device, such as a PC or smartphone. Wearable devices using myoelectric signals have already hit the consumer market and will continue migrating to devices intended for people with disabilities.

### **Software Distribution Revolution**

Software procurement and acquisition is undergoing a fundamental shift. The way in which software is located, bought and updated is now in the province of the software distribution marketplace. With the continued growth of cloud platforms from Amazon Web Services (AWS), Microsoft, Google, IBM and others, as well as the ever-increasing introduction of cloud-oriented products and services, the role of marketplaces for selling and buying is gathering steam. The cloud platform providers realize (to varying degrees) that they must remove as much friction as possible in the buying and owning of processes for both their own offerings and the offerings of their independent software vendors (ISVs) (i.e., partners). ISVs or cloud technology service providers (TSPs) recognize the need to reach large and increasingly diverse buying audiences.

### **Smartphone Disintermediation**

The use of other devices, such as virtual personal assistants (VPAs), smartwatches and other wearables, may mean a shift in how people continue to use the smartphone.

CIOs and IT leaders should use wearability of a technology as a guiding principle and investigate and pilot wearable solutions to improve worker effectiveness, increase safety, enhance customer experiences and improve employee satisfaction ■





# Majority Of Consumers Still Prefer Humans As Chat Agents: Study

While most agree chatbots can be fast and convenient in certain situations, consumers cite a lack of intelligence as their top complaint against automated bots, and 65% still prefer a human agent on the other end of the chat

**M**ost chatbots still aren't smart enough to meet consumers' great expectations, according to a Pegasystems study. While most agree chatbots can be fast and convenient in certain situations, consumers cite a lack of intelligence as their top complaint against automated bots, and 65% still prefer a human agent on the other end of the chat.

72% of consumers generally find chatbots to be helpful to some degree, but the interaction quality can be quite mixed. The majority (58%) rank their chatbot experiences as merely 'adequate' – doing some tasks



well and others poorly. Another 18% grumble how chatbots are ineffective or even annoying. Only 16% gave their chatbot experience a high quality rating.

Analysts expect chatbot usage to rise significantly in the next two years – a shift that could prove costly for brands that don't evolve their bots. According to Gartner, "25% of customer service and support operations will integrate virtual customer assistant (VCA) or chatbot technology across engagement channels by 2020, up from less than 2% in 2017."

### Best bots keep it simple

Consumers tend to favor chatbots for

chatbots can be almost as good as interacting with a human, while 34% disagree, and 23% don't know.

### Artificial intelligence or artificial stupidity?

However, speed and simplicity can only take today's digital consumers so far. While most brands claim artificial intelligence power their bots, consumers' top chatbot complaints include:

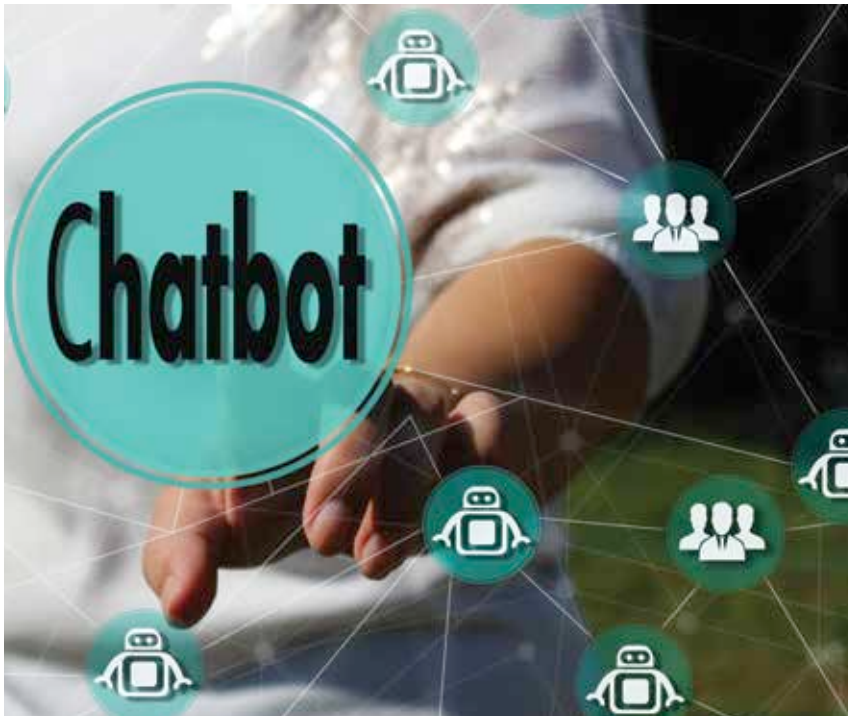
- Not enough smarts to effectively answer questions (27%)
- Lack of context in the conversation (24%)
- Robot-like engagement with few human qualities (14%)

Similarly, the top reasons consum-

The survey found a separate group that have yet to try chatbots at all and have no plans to start anytime soon. These bot holdouts, which skew towards a slightly older demographic, say they haven't used chatbots yet due to:

- Lack of any real exposure to chatbots (53%)
- A personal preference to only engage with a human (30%)
- Lack of knowledge on how to use chatbots (23%)

A full 45% of these consumers without chatbot experience said they won't try one in the next year while another 30% aren't sure, which presents a roadblock to companies



Only 25% of these non-users said they would be willing to experiment with a chatbot, albeit with some reluctance. Their biggest concerns stem from their lack of experience: they simply don't know how to use it

only the simplest queries that can be done quickly. The most popular chatbot use cases are:

- Tracking an order (60% selected)
- Finding basic information (53%)
- Asking basic questions (49%)

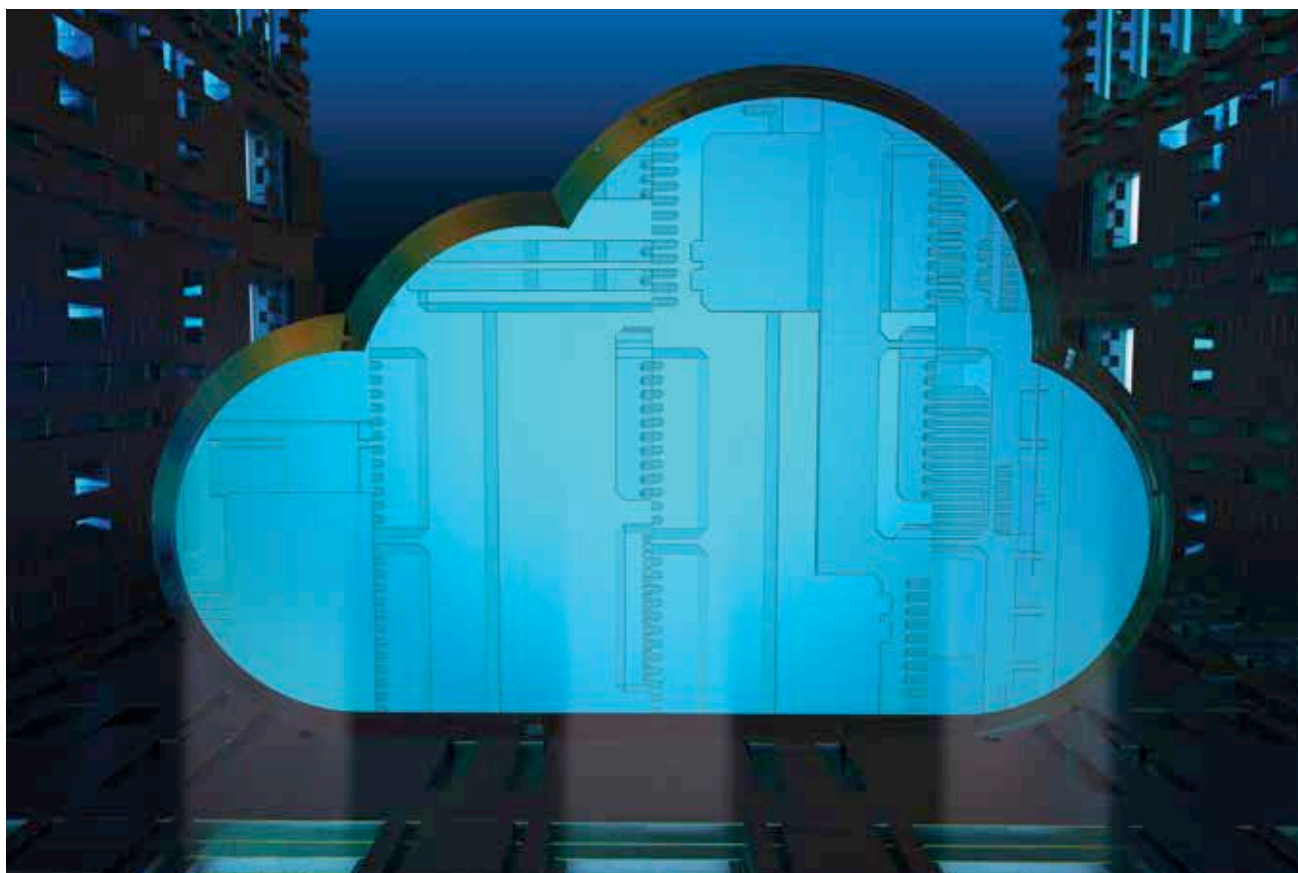
The respondents also noted that fast service (56%), ability to engage on their own schedule (37%), and convenience (36%) are chatbots' top benefits. When done well, 43% say

ers would drop a chatbot session are when bots can't answer their questions (47% selected), make them do more work than expected (47%) or are too vague in how they can assist them (43%). Separately, only 17% said they would use a bot to purchase goods and services, further muddying the path from bots to direct revenue.

### In no mood for chit chat

trying to expand reliance on digital service channels. Only 25% of these non-users said they would be willing to experiment with a chatbot, albeit with some reluctance. Their biggest concerns stem from their lack of experience: they simply don't know how to use chatbots (top concern at 46%), lack confidence in chatbot effectiveness (31%), or worry about security and privacy (27%)■





# Majority Of Enterprises State Hybrid Cloud Is The Ideal IT Model: Study

The study also reveals public cloud is not a panacea

**E**nterprises plan to increase hybrid cloud usage, with 91% stating hybrid cloud as the ideal IT model, but only 18% stating they have that model today, according to Nutanix's first ever global *Enterprise Cloud Index*, measuring enterprise plans for adopting private, hybrid and public clouds.

The findings also revealed that application mobility across any cloud is a top priority for 97% of respondents – with 88% of respondents saying it would “solve a lot of my problems.” Additionally, the report found public cloud is not a panacea; IT decision makers ranked matching applications to the right cloud environment as a critical capability, and 35% of organizations using public



clouds overspent their annual budget. When asked to rank the primary benefits of hybrid cloud, interoperability between cloud types (23%) and the ability to move applications back and forth between clouds (16%) outranked cost (6%) and security (5%) as the primary benefits.

Nutanix commissioned Vanson Bourne to survey IT decision makers about where they are running their business applications today, where they plan to run them in the future, challenges in setting up their cloud environments and how their cloud initiatives stack up against other IT projects and priorities. The survey resulted in approximately 2,300 respondents from multiple industries, business sizes and geographies in the Americas; Europe, the Middle East, Africa (EMEA); and Asia-Pacific and Japan (APJ) regions.

In roles centered on agility and digital transformation, IT teams understand that runtime environments for enterprise apps change constantly. Respondents indicated a need for greater orchestration and application mobility across cloud environments, as they seek flexibility to move apps to the “right” cloud on a more dynamic basis. In addition, shadow IT practices that circumvent enterprise IT teams are posing a significant challenge to forecasting and controlling public cloud spend with well over half of respondents (57%) reporting one or more incidents of shadow IT.

Other key findings of the report include:

■ **Hybrid cloud better addresses business needs over single public cloud, including the price tag:**

87% of respondents said that hybrid cloud as an IT trend is having a positive impact on their businesses, and more hybrid cloud users reported all their needs were being met (49%) compared to single public cloud users (37%). Furthermore, organizations that use public cloud spend 26% of their annual IT budget on public cloud. Perhaps most striking is the fact

that only 6% using public cloud came in under budget, while nearly six times as many (35%) overspent in their use of public cloud resources.

■ **Security is top of mind for determining workloads:**

71% of respondents surveyed for the report ranked data security and regulatory compliance as the top factor in determining where to provision their workloads. This was followed by performance at 62%, ease of management at 53%, and cost at 52%.

■ **App developers today are circumventing IT:**

57% of respondents said their developers are circumventing IT when it comes to deciding where applications run, putting the organization at potential risk.

■ **Finding hybrid IT talent is difficult:**

With clear benefits to a hybrid model, respondents say scarcity of hybrid experts is a challenge, with 54% claiming talent retention is part of the problem.

■ **EMEA is expected to surpass the Americas with hybrid cloud adoption:**

Regionally, the Americas reported greater use of hybrid clouds now (22%) and within 12 months’ time (31%). However, the two-year outlook has EMEA (43%) surpassing the Americas’ hybrid plans (39%) and APJ (39%) catching up.

“As enterprises demand stronger application mobility and interoperability, they are increasingly choosing hybrid cloud infrastructure,” said Ben Gibson, chief marketing officer for Nutanix. “While the

advent of public cloud has increased IT efficiency in certain areas, hybrid cloud capabilities are the next step in providing the freedom to dynamically provision and manage applications based on business needs. However, the findings of this study reveal an important gap in the market: Organizations need IT talent to manage their hybrid cloud models, especially in the next 12 to 24 months.” ■







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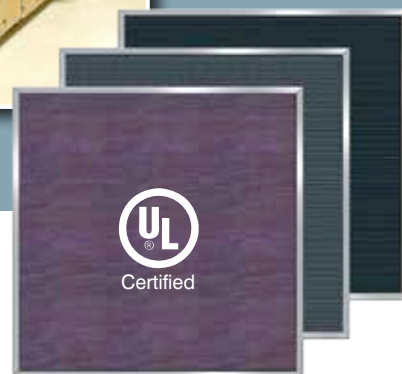
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