



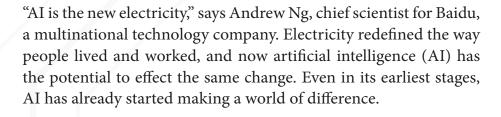
Use cases and scenarios on how AI will redefine the way IT service desks work

ManageEngine ServiceDesk Plus

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So what exactly is AI? Gartner defines AI as:

"Technology that appears to emulate human performance typically by learning, coming to its own conclusions, appearing to understand complex content, engaging in natural dialogs with people, enhancing human cognitive performance (also known as cognitive computing), or replacing people on execution of nonroutine tasks."

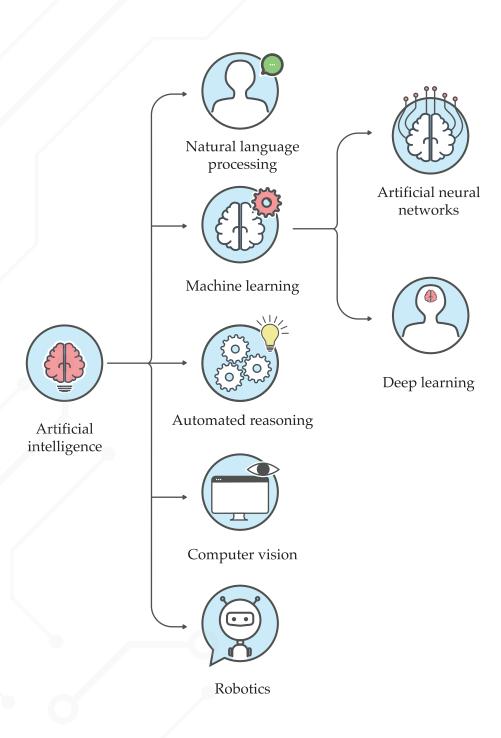
AI can fall into one of three categories based on its application and capabilities:

- 1. Artificial narrow intelligence.
- 2. Artificial general intelligence.
- 3. Artificial super intelligence.

Artificial narrow intelligence	Artificial general intelligence	Artificial super intelligence
Works within a single field with limited context	Understands and reasons like a human	Works smarter and more efficient than humans in practi- cally all fields
Good at routine jobs	Good at intellectual tasks	Good at all tasks: routine, non-routine, creative, and intellectual
Available for practical applications	Not yet available, but perhaps in a few decades	Unknown if or when this type of technolo- gy will be available
E.g. Siri, Alexa, Tesla's self-driving cars	E.g. JARVIS from Iron Man	E.g. The super intelligent ARIIA from <i>Eagle Eye</i>



All current uses of AI fall under the category of artificial narrow intelligence. Existing AI solutions are focused on one single task, usually a routine task, and can train themselves to become better than humans at these tasks. These applications of AI are enabled by various technologies including speech recognition, computer vision, machine learning (ML), natural language processing, and robotics.



# Chapter 02

Daily applications of Al

## Daily applications of Al

The current use of AI stretches across multiple fields, from machines being able to understand voice commands to performing medical diagnostics. To start, all the virtual assistants that we interact with utilize AI technologies like natural language processing and speech recognition. Then, there are self-driving cars, which are advanced enough to predict accidents based on various factors, and take proactive action to protect riders. Typically, these self-driving cars use a combination of multiple artificial narrow intelligence applications that each perform specific tasks and interact with each other to safely navigate the vehicle.

### 2.1 AI in medicine

Google Brain, the AI research group at Google, trained a neural network model to diagnose diabetic retinopathy. Approximately 128,000 retinal scan images were fed into a deep learning algorithm to create a model that can diagnose and predict diabetic retinopathy with the same accuracy as experienced ophthalmologists. Applying the use of AI in this instance could help speed up the evaluation process, so doctors can focus more on treating patients. Similarly, Microsoft Azure Machine Learning is used to predict the success of eye surgeries at the LV Prasad Eye Institute based on a historical data set.

# 2.2 AI in education and development

The government of Andra Pradesh, a state in southern India, partnered with Microsoft to utilize AI and ML in helping government machinery address some of the challenges the state is facing. These technologies have been implemented in several different areas including education, health care, and agriculture.



On the education front, Azure Machine Learning has helped schools predict school dropouts, so educators can proactively plan and execute corrective measures to help these students. This prediction is based on a complex set of data and considers multiple factors like student performance over time, the infrastructure of the school, and the skill set of the teachers.

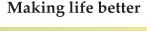
# 2.3 AI in agriculture



Azure Machine Learning has also helped farmers identify the ideal week to sow their crops for maximum yield. Through a mobile app, farmers in villages across Andra Pradesh and Telengana can view different metrics and recommendations that can help them make farming efficient and profitable. These insights and recommendations are derived by an ML model that predicts patterns based on the weather forecast, historic rainfall, respective crop yield, soil health, and more.

These are just a few examples of how AI is making our lives better and easier. AI has the potential to change every industry by helping us identify patterns and providing us with valuable insights and recommendations based on those patterns.

### Making life easy











Chatbots Self-driving cars

Agricultural recommendations

Prognosis and outcome prediction



Virtual assistants

Medical diagnosis

# Chapter 03

Al in IT service management

### New standard or a passing fad?

With all the advances in the area of AI and its widespread application across various disciplines, this new technology is making its way to IT service management (ITSM). ITSM has seen multiple waves of new technology, each promising to redefine the way things work. But many of them made little to no impression, and have passed on as mere fads. So the obvious question on everyone's mind is: Will AI actually make ITSM easier and more efficient?

Industry experts have some strong predictions on this. Gartner predicts, in its *Predictions 2018: Artificial Intelligence* report, that by 2022, 40 percent of customer-facing employees and government workers will consult an AI virtual support agent daily for decision or process support. Gartner adds that various AI technologies will help support agents respond faster and more efficiently, while chatbots might become the front line of service desks.

AI will start having a real impact on our IT service desks when it is able to:

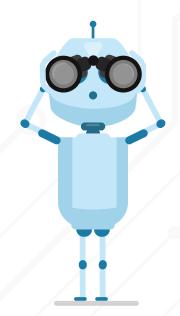
- 1. Perform actions that humans are bad at.
- 2. Perform actions that humans would rather not do.

These actions can fall into one of three categories: smart automations, strategic insights, and predictive analytics. For example, routing incoming tickets manually consumes a lot of time—time an IT technician could use for more important tasks. Some help desks have automated ticket routing by defining rules that categorize requests based on preset conditions and parameters, but these rules are static, meaning they won't adapt or improve with time. With the help of AI technology like ML, service desks can create a categorization model based on historic IT service desk data. Best of all, these ML models will become more accurate over time by taking live data into account. Such ML-based models are more efficient than manual categorization or rule-based automations.



# The scope of AI in ITSM

Performing actions that humans are bad at	Performing actions that humans would rather not do
Identifying tickets that might violate SLAs	Manually categorizing and prioritizing tickets
Identifying the right window to push patches to hundreds of machines	Handling L1 incidents which already have a documented resolution or workaround
Performing impact analysis and risk minimization during change planning	Responding to all user messages, which can include junk or irrelevant requests



Vendors can create similar AI-based models to generate insights and predict anomalies in IT service desks, which otherwise takes a lot of time, effort, and skill from humans. Some real-life scenarios might include suggesting the right window for patch updates, aiding in change planning and implementation, flagging requests that could violate an SLA, and predicting IT problems.

# Chapter 04

The progression of AI in IT service desks

# The progression of AI in IT service desks

The next question everyone wants an answer to is, where will it all start?

Even with the expansion of AI applications across various fields, the AI technology with the furthest reach today is virtual assistants. Almost every smartphone today has a virtual assistant that helps people with shopping, travel, finance management, time management, and more. And with technologies like Google Duplex taking shape, the role of these virtual assistants is bound to expand soon.

Similarly, the first application of AI in IT service desks will likely be chatbots and virtual IT service assistants. Though not immediately, AI-based virtual assistants will probably replace humans to become the first point of contact between end users and the IT service desk. We will get a small preview of this with context-specific chatbots that can help take some of the load off technicians by handling simple requests.

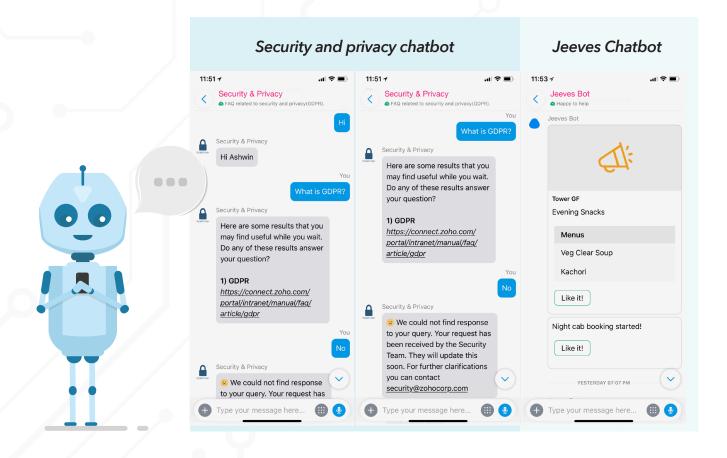
For example, here at ManageEngine, we have a specific chatbot that helps us with any questions related to the GDPR or security and privacy issues. We also have a chatbot, rightly named Jeeves, that updates our lunch and dinner menus. These kinds of chatbots operate with a knowledge base as their foundation. If these bots reach a point where they run out of options or answers, they pull in a human to finish the job. Chatbots can also help users perform other simple IT service desk operations like creating a ticket, raising an asset request, or even requesting a password reset.

Below are some simple AI-based features that will make their way into IT service desks:

- Automatic categorization of incidents.
- Intelligent agent assignment for incoming requests.
- Anomaly detection by flagging unusual repeat incidents.
- Using predictive analytics to flag requests that could violate SLAs.

In this white paper, we'll explore more specific ITSM use cases and try to understand how AI can add value to service desk operations.





# Chapter 05

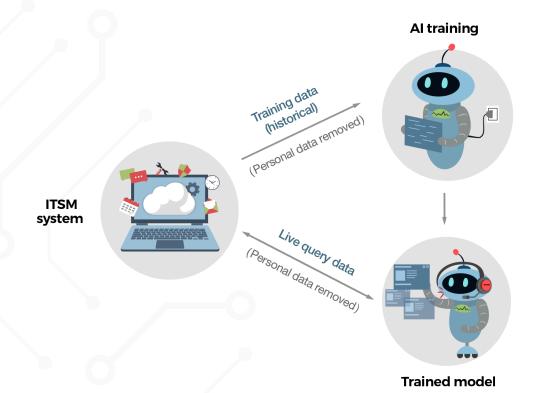
How AI works in ITSM



### How AI works in ITSM

AI algorithms and applications are developed based on the available documented knowledge and historic data; that means AI is as effective as the knowledge base and data it's developed on. Similarly, in ITSM, to develop an AI-based model for any specific context, there has to be a properly documented set of resolutions, workarounds, knowledge articles, and well-maintained historical data. For example, to train an AI-based categorization or prioritization model, we need a historic database of all requests with parameters like request type, level, impact, urgency, and site, and it all needs to be properly documented.

On top of everything, AI-based models like these aren't universal, which means while a certain model may work for one service desk, it likely won't work for many others. Categorization and prioritization models are trained on a specific data set, and only work for the service desk from which that data set is pulled. These models continuously train themselves with live data to increase their accuracy and effectiveness over time.



# Chapter 06

Al-based features and use cases in ITSM

# Al-based features and use cases in ITSM

Apart from the few AI-based features discussed in Chapter 4, below are more use cases across various ITSM modules that explain how AI-based models and features can change the way IT service desks work.

### 6.1 Chatbots

Chatbots can be trained to handle a particular category of requests and incidents, provided there is proper documentation of the past request history and all relevant knowledge articles.

In this section, we'll discuss two scenarios where chatbots could help service desks: the first is an application of artificial narrow intelligence, which is available now, and the second is based on artificial general intelligence, which is more efficient but might take longer to develop.

One issue that seems to haunt both end users and IT technicians alike is when the printer stops working. In most IT service desks, the solution to every printer issue is already well-documented, which means many end users can resolve these issues themselves, without involving an IT technician. But still, there are a number of printer incidents that get reported, which might impede productivity. Such incidents can be handled by a chatbot trained to specifically handle printer issues.



# Scenario 1-Resolving an issue over chat through a chatbot

Below is a typical conversation between a chatbot and an end user reporting a printer problem.

Hi, welcome to the help desk. How can I help you?





I can't use the printer on my floor.



I'm sorry about that. This might mean your workstation isn't configured properly. You can re-configure your printer settings in a few simple steps as explained in <a href="this document">this document</a>. Does that fix the problem?



No, I've already done that.



Alright. Did you check for a paper jam in the printer? If there is a paper jam, you can clear it yourself. Please follow these instructions.



I don't think there's a paper jam.

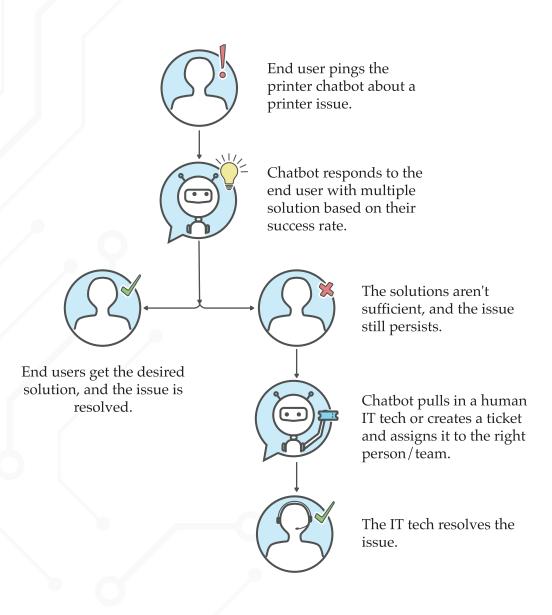


Alright then. A ticket has been created on your behalf. You can check the details of the ticket <a href="here">here</a>. Your ticket will be resolved within 4 hours by technician.



Thank you.

In this scenario, the chatbot responds to the user based on the available knowledge base articles. The chatbot suggests the solution with the highest success rate to the user first, followed by the other available solutions in the order of their success percentage. When the chatbot runs out of solutions to suggest, it can pull in a human technician to help the end user; it can even be trained to create a ticket on behalf of the user and have it assigned to the right technician or a support group based on past data. With multiple third-party chatbot tools in the market, and various solutions provided by IT service desk vendors, service desks can implement chatbots right now.





# Scenario 2: Proactively identifying issues and providing the necessary resolution

As the technology driving AI advances, chatbots will be able to do more than just suggest solutions. For example, imagine the same printer issue as before with a more involved chatbot. AI algorithms and chatbots can become more intelligent than they are today, and soon, conversations may look like this:

Hi, welcome to the help desk. How can I help you?





I can't use the printer on my floor.

I'm sorry about that.

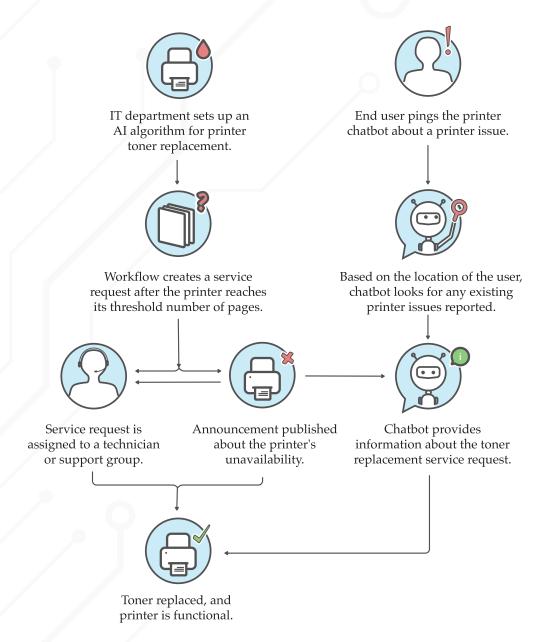


I see you are on the 5th floor. The printer on the 5th floor needs a toner replacement. A ticket with ID#0023 has already been created and is assigned to <tech>. You can view the details of the request here. An announcement regarding this issue has been published in your IT self-service portal. The printer should be up and running within 3 hours. Until then, we advise you to use printers on other floors. Sorry for the inconvenience.
Is there anything else I can help you



with?

No, I'm good. Thank you.



In the above conversation, we can see that a request was created for toner replacement even before the user reported the issue. With ML-based models, service requests can be automatically created for replacing toner and other supplies before they run out. And, when the user reported the issue, the chatbot looked into the requests database to see if a request had already been created for the same issue before checking the solutions module. If and when it identifies a request, the chatbot provides all relevant details to update the user. Although this functionality doesn't yet exist, it may not be long before it does.

Apart from these two scenarios, there are multiple ways chatbots can come in handy. Below are a few examples.

### Remote user asset request

An end user in the field (e.g. a sales person) reports that their laptop is slow and needs to be replaced. They try to find the right asset upgrade form but can't. They next try calling the service desk, but don't get through to anyone. As a last resort, they reach out to the chatbot.



Hi, my laptop is too slow and it crashes a lot. I need to upgrade my laptop.



Hi, the laptop assigned to you is <Model No>, with 1GB RAM and 512GB memory. Would like to upgrade to a Mac or a Windows machine?



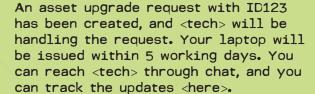
A Mac.

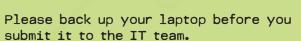
Please confirm the model and specifications: Macbook Pro 1GB RAM, 1TB hard drive





Yeah, that looks good.







# Add notes, comments, or annotations to a request

An IT tech is working remotely to diagnose an issue with a workstation, so they aren't able to access the service desk portal to update the request details. Instead, they use the tech assistant chatbot to get things done.



Hey Zia, show me notes for request ID300.

<note #1> updated on June 12, 2018,
09:45am
<note #2> updated on June 12, 2018,
11:05am
<note #3> updated on June 14, 2018,
05:30pm
Do you want to add a note to request
ID300?





Yes, please.

Note added. <note #4> updated on June 18, 2018, 04:30pm





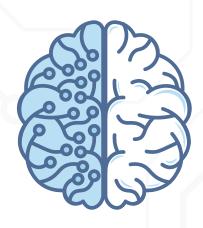
This looks good. Thanks.

You're welcome. You can access the ticket and view more details <a href="here">here</a>. Do you need more information?





No.

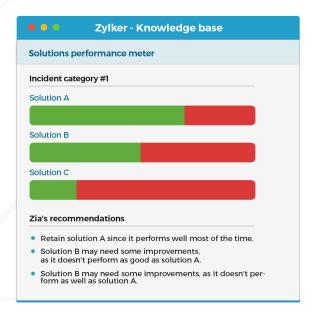


## 6.2 Knowledge management

As explained earlier, AI algorithms and chatbots are only as effective as their available knowledge base. Fortunately for us, AI can also help build a sturdy knowledge base. We will discuss two use cases to understand how AI can contribute to knowledge management in IT service desks.

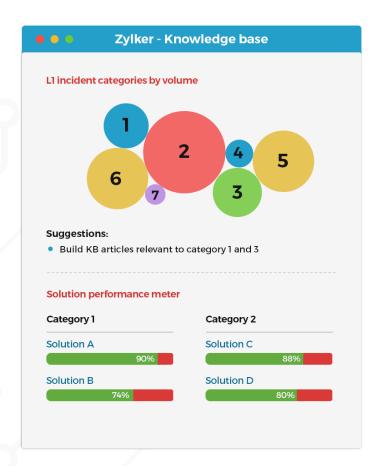
# Scenario 1: Automatically rating solutions to approve and reject them

For each incident or incident category, there may be multiple solutions and knowledge base articles that have been used over a period time. Specific ML-based models can be trained to identify the success rate for each of these solutions based on historic performance. This can be done by considering multiple factors like the reopen rate of tickets, end user and technician rating of articles, and acknowledgement from end users. Based on metrics like these, an ML-based model can even suggest which articles should be retired and which articles could be improved. The grading of solutions based on their performance over time also helps the IT service desk provide the right solutions to users right at the time of ticket creation, and assist chatbots during a chat session.



# Scenario 2: Identifying problem areas and collating knowledge base articles

ML-based models like those discussed in scenario 1 can be trained to identify which incident categories have the highest number of incoming L1 incidents, repeat incidents, and reopened incidents. Consequently, an ML model can flag these categories based on the severity of the above parameters. It can also deliver insight on which categories need more knowledge management efforts from the IT service desk team, like documenting proper solutions, getting them reviewed, and publishing them. This helps the service desk team identify areas that need the most work and build relevant solutions and knowledge base articles to help end users and technicians alike.





### 6.3 Service request management

Today, complex service requests like employee onboarding are either manually coordinated by technicians, or based on predefined automations. Manually performing these tasks can be inefficient and cumbersome. With respect to current automations, most processes are static and lack intelligence. These automations don't necessarily fit all the possible scenarios, and require human intervention periodically to stay on course. But with the application of AI technology like ML, models and algorithms can be trained to dynamically automate service request workflows based on request history. These ML-based automation models continue to learn with each bit of live data to fine-tune workflows for higher efficiency.

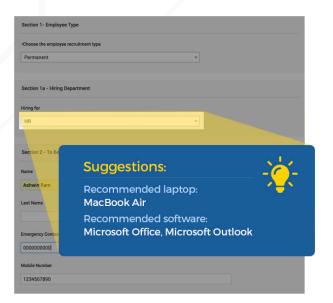
We'll consider two specific scenarios of an employee onboarding request to understand how an ML-based automation model can improve service delivery.

# Scenario 1: Automating an employee's onboarding request

Employee onboarding requests typically involve multiple people from multiple departments, and the combinations vary when the finer details of the request roll in (e.g. job title, asset details, work location). These factors make automation very difficult. With ML, the entire onboarding process can be automated. The model can learn from the historic database of employee onboarding requests to perform a series of automations like triggering the necessary tasks based on the type of employment, role, and department, and assigning new requests to the right technicians.

This same model can also come up with suggestions like what hardware and software should be delivered at the time of request creation. The ML-based model recognizes patterns in the historic employee onboarding requests database and connects the dots to generate these suggestions. For example, this model can learn the laptop models and software used by people joining the organization in a particular role.

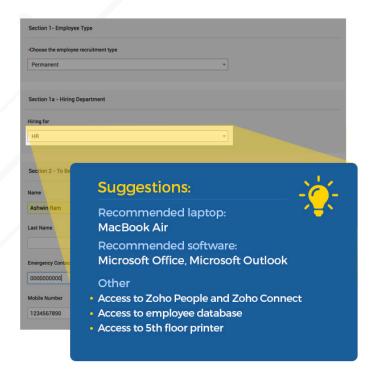
For example, designers need more powerful machines while content writers or HR personnel can get by with a more basic computer. These suggestions, coupled with automations, can streamline the service delivery process.



# Scenario 2: Expanding the employee onboarding experience

In the previous example, we saw an ML-based employee onboarding model that could automate workflows and provide operational suggestions for better service delivery. The same model can be extended to deliver a holistic experience and enable complete onboarding. ML-based models can also analyze the types of requests created by new employees a few months into their job. These requests are usually service requests like requests for access to the floor printer, physical access to an office location or a server room, and access to certain databases.

Say, for example, a new employee in HR needs access to the company's HRM tool, the intranet portal, and the employee database. These requests are typically created by the user immediately after onboarding. The onboarding model can pick up patterns like this from the request history and provide them as suggestions right when the onboarding request is created, avoiding multiple requests.





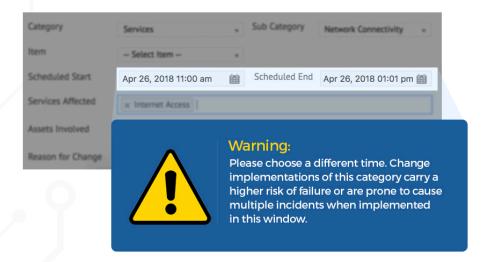
### 6.4 IT change management

IT change management is one process that can make or break a company's IT infrastructure. A lot of planning and risk evaluation goes into changes before they're implemented; despite all this effort, changes can still fail due to human error. When it comes to analyzing changes, humans can also struggle to mine insights from the huge volume of data generated on IT change management and implementation. AI can help minimize change management risks by preventing human error and improving analysis.

# Scenario 1: Helping to plan change workflows with minimal risks

AI can learn from the available history of IT change records and offer service desks a variety of insights and suggestions at different points in change workflows.

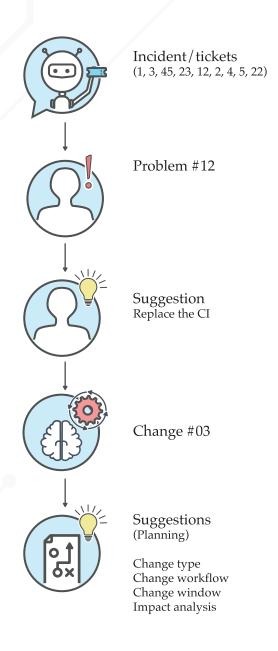
- 1. *Planning*: The right window to implement changes of a particular category or on a particular configuration item (CI).
- 2. *Risk evaluation:* The cascading impact of issues.
- 3. Evaluation by the change advisory board (CAB): Critical failure points and areas of conflicts in the change workflow.
- **4.** *Implementation:* Signs of change failure and proactive warnings to initiate change rollback.



# Scenario 2: Identifying problem areas and helping with change implementations

Many IT outages can be avoided by identifying and fixing underlying problems before they cause downtime. As explained earlier, AI systems can identify patterns from huge volumes of data that humans simply can't. ML-powered systems can identify repeat or related incidents in the torrent of incoming requests and alert the IT service desk team about potential IT problems. Similar ML-powered models can help service desk

teams diagnose problems, identify their underlying causes, and provide solutions and workarounds that have worked for similar IT problems in the past. If the solution for the identified IT problem involves a change implementation, a model as discussed in scenario 1 can help.



This entire model is similar to a self-driving car where multiple AI systems work together towards one common objective—transporting people without collisions or accidents.

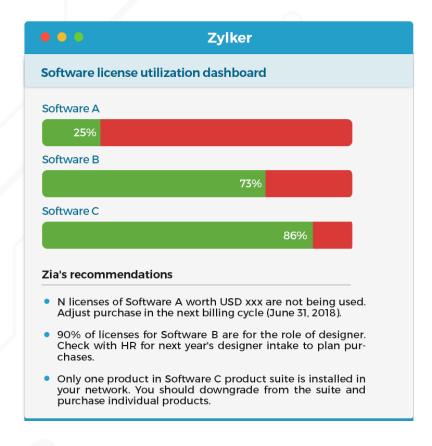
### 6.5 IT asset management

IT asset management and a CMDB serve as the foundation on which every ITSM process operates. AI can also help IT service desk teams monitor and manage IT hardware and software assets better. ML systems can constantly monitor the performance of a CI or go over the available CI performance data and predict breakdowns, saving both end users and IT teams from a pile of trouble. AI can help IT service desk tools flag anomalies and generate critical warnings by connecting the dots across multiple areas, which is almost impossible to do manually.

Consider this real-life example from an IT service desk team who faced a change failure from something simple. During a change implementation, the IT team started facing issues with a particular firewall critical to the change. It was only when they reached out to the supplier for support that they realized their maintenance contract with the supplier had run out. Without support, the firewall went down and the change implementation ultimately failed. Observations like these can be overlooked by humans during impact analysis, but an ML-based model can scan mountains of CI data and relationships easily, providing insights and contextual warnings that can help avoid such failures.

On the software asset management front, AI systems can help optimize software license spending by generating insight about software usage patterns across the organization. In the example below, the AI-based model analyzes the software license distribution and consumption patterns to forecast demands for software and provides suggestions to cut down purchases or downgrade licenses. These models can help companies maintain higher levels of compliance, and assist IT service desk teams during vendor audits.





These are some areas where AI will start leaving an impression on ITSM. Some AI capabilities are achievable immediately and some are still a few years out. Chatbots and ML-based categorization will be the first immediate application of AI in ITSM tools. Some ITSM tool vendors have already started offering both these capabilities to their end users. There are also multiple third-party vendors who provide plug-and-play solutions that can perform these operations. In just a few short years, we may see more than just projected use cases for AI-based features. Soon, these use cases could be our reality.

# Chapter 07

Al applications beyond ITSM

# Al applications beyond ITSM

As explained in the introduction, AI has the potential to impact every industry for the better, including other areas of IT management such as IT operations management, IT security management, and endpoint management.



Al for IT operations	Al for security information and event management	Al for endpoint management	
Automatic adaptive threshold configuration	Detect insider access abuse	Automatically determine the best time to push patches to each endpoint, greatly reducing failures	
Intelligent recommendations for best times to perform firmware upgrades	Enable intelligent detection of data exfiltration	Provide timely notifications for capacity planning by predicting additional licensing requirements	
Prevent downtime by controlling errors in configuration changes	Identify root causes for repeated account lockouts and user logon failures	Identify data leaks, data theft, or attack attempts on smart devices; alert users and administrators	

# Chapter 08

Conclusion— Getting ready for the AI wave



# Conclusion: Getting ready for the Al wave

Given that AI has the potential to redefine the way IT service desks and IT service desk teams work, it's essential that service desks are prepared for the upcoming AI wave. As explained above, the effectiveness of any AI application or model depends on the data it's trained on as well as the available knowledge from things like documented solutions. To get the most out of AI, IT service desk teams have to properly document all their requests, problems, and changes; maintain an accurate IT service desk database; and build a well-equipped knowledge base. As ITSM tool vendors try to integrate AI into their tools, it's important that service desk teams prepare themselves to truly reap the benefits of AI in ITSM.

### About ServiceDesk Plus

ServiceDesk Plus is enterprise and IT help desk software with integrated asset and project management capabilities. With advanced ITSM functionality and easy-to-use capability, ServiceDesk Plus helps IT support teams deliver world-class service to end users with reduced costs and complexity. It comes in three editions and is available in 29 different languages. Over 100,000 organizations across 185 countries trust ServiceDesk Plus to optimize IT service desk performance and achieve high end-user satisfaction.

To learn more about ServiceDesk Plus and its features, please visit www.manageengine.com/service-desk.

### About ManageEngine

ManageEngine is bringing IT together for IT teams that need to deliver real-time services and support. Worldwide, established and emerging enterprises - including more than 60 percent of the For-tune 500 - rely on our real-time IT management tools to ensure tight business-IT alignment and optimal performance of their IT infrastructure, including networks, servers, applications, desktops and more. ManageEngine is a division of Zoho Corporation with offices worldwide, including the Netherlands, United States, India, Singapore, Japan and China.

For more information, please visit www.manageengine.com.

