



Automated Application Performance Management with Appicare

Investing in Intelligence for Peak Performance and Stability

Automation, if applied strategically to detecting, diagnosing, and resolving performance issues, can have a dramatic impact on productivity, environment stability, and operational effectiveness. *This white paper explains several cost-cutting strategies and innovative methods to improve the effectiveness of performance management.*

JEE AND SOA PERFORMANCE MANAGEMENT

Current Challenges

In today's fast moving world businesses depends on IT. Complex application are supporting business critical tasks. These business critical applications provide businesses the competitive edge. Not only the availability of these applications is critical, performance and end user experience of these applications, makes or breaks the business.

Growing complexity of these applications - multiple vendors and open-source code, architecture spanning across multiple data-centers and constant enhancements to keep up with business requirements - makes performance management extremely challenging.

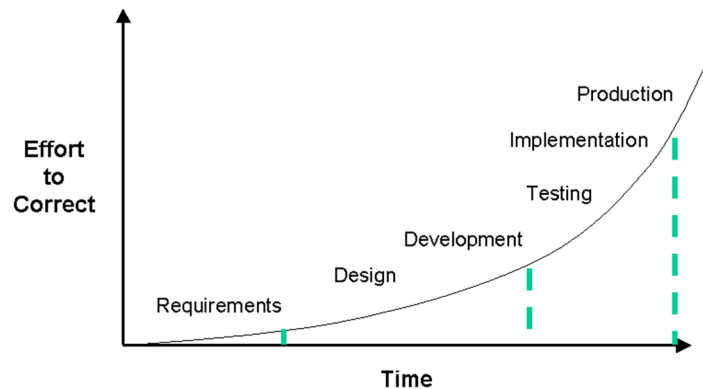
Traditional APM tools help with diagnosis of production issues in a reactive manner, a laborious and time consuming troubleshooting starts after the issue has surfaced and has already caused the damage. In addition the troubleshooting process is extremely people dependent - decisions on what to monitor and when, gathered data analysis/interpretation and decisions on next steps are all manual.

This “manual and reactive” approach is the source of much downtime and revenue loss. To remain competitive, you must have processes in place to identify problems before the symptoms show up and the damage is done.

FACT: End users report 73% of all performance problems. This means that current monitoring solutions are insufficient and miss problems.

The reality of static monitor provisioning is that, over time, the monitors become out of sync with the crucial services keeping the environment stable. It takes much effort to keep monitors up to date in complex environments. And with most monitoring solutions, once the monitors no longer cover the entire environment, it takes a comprehensive audit involving architecture, development, and monitoring staff to identify what is missing and what is no longer applicable. If this effort isn't done, your end users or partners soon make you aware of these blind spots at the worst possible time: during production outages. To stay on top of changes, today's performance management solutions must be dynamic, fast, customizable and intelligent.

Because proactive detection of problems and fine tuning the configuration is so complex and time-consuming, many enterprises are running applications with not so optimal configuration. A lack of early and proactive performance management leads to expensive corrections later in the project.



FACT: The cost and effort of correcting software defects and environment issues increases exponentially later in the development lifecycle

There is no question that proactive testing and tuning is a must for stability and scalability of the applications. Many outages are caused by inappropriate configurations. Application tuning is a complex, but vital process in getting the best performance & predictability from JEE & SOA application. Heap size, the Garbage Collection mechanism, TCP configurations and many other tunables significantly impact an application's performance. If the application & its environment (code, application server, OS) is not tuned correctly, not only performance gets impacted, but it often leads to service disruptions.

"Today's applications are an increasingly complex aggregate of many moving parts, and problems lurk not only in the code, but in architecture, platform configuration, links with dependent internal or external systems, and infrastructure capacity. Resolving these issues in production by throwing hardware at them is the most costly and ineffective approach possible."

Jean-Pierre Garbani
VP and Research Director at Forrester Research,
Performance Management and the Application Life Cycle.

It is much easier to find the root cause of the problem if you see it happening. Unfortunately, root-cause analysis often occurs after an incident, when diagnostic data and server state information is no longer available. This is because the stability of your production environment can't wait for a detailed and thorough analysis to occur. So soon after any incidents, support teams quickly proceed with steps to restore functionality. This leads to a loss of root-cause data. The new generation tool needs to automatically detect the problem condition and gather all the necessary root cause analysis data on the first occurrence of the issue.



FACT: most organizations require six service desk calls to identify the correct problem resolution group.

The New Approach to Performance Management

Invest in Knowledge

The degree to which organizations can maintain healthy environments and deliver the consistent performance depends directly on the capability and availability of their own experts. When subject matter experts leave, they take their knowledge and experience with them. The cost required to replace and train new experts is expensive. A good performance management solution must:

- Reduce the dependence on individual's knowledge
- Foster knowledge sharing
- Reduce the dependence on single subject matter experts, and
- Let non-experts reach sound conclusions based on expert proven and scientific fact.

The solution should also come with pre-defined, industry-accepted knowledge. That way, your staff can spend time on more important issues, instead of re-inventing the wheel. Organizations with expert performance management knowledge integrated into the fabric of their operational processes achieve consistent performance, reduce training time and cut costs.

"An investment in knowledge pays the best interest."

Benjamin Franklin

Preventive

Best practices and lessons learned should be automatically applied to application environments. Why wait for a misconfiguration to cause an application failures, why not proactively detect that a certain problem condition exists and make the appropriate adjustments.

An ounce of prevention is better than a pound of cure.

Automated

The ideal performance management solution should provide a method to automate problem diagnosis, monitor provisioning, and root-cause detection. This automated knowledge base must be organic, adjustable, and easily updated with proprietary knowledge, because your applications grow and change over time.

When issues arise, automation not only provides lightning-fast response time, but also frees your staff to handle more important work.



Dynamic

Over time, performance monitoring solutions must be able to change as the application changes. The most efficient way to get comprehensive and dynamic problem detection is to evaluate common systemic indicators of performance problems holistically, using rule-based analysis.

Combining decision-making intelligence with your application tier's own internal diagnostic capabilities gives you a continuous, unobstructed view into every service's availability, without the maintenance problems and complexities that come with static monitoring solutions.

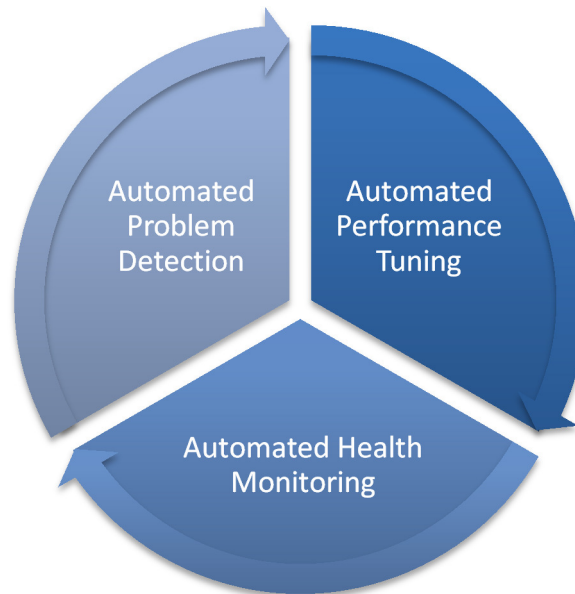


THE ARCTURUS SOLUTION - PERFORMANCE SIMPLIFIED

The Arcturus Solution - Applicare

Arcturus Applicare provides a very low overhead, easy to deploy, intuitive, adaptive, proactive & preventive solution for Business Transactions Monitoring (BTM) and Application Performance Management (APM). Applicare helps during entire software development life cycle including development, performance testing and operations.

Applicare leverages Arcturus' patent pending technologies - IntelliSense, IntelliTrace and Knoms, to deliver high performing and very effective APM + BTM solution that is up and running in less than 10 minutes.



Applicare - Complete Performance Management

It is a fact that user defined transaction profiling is reactive in nature. Based on best of their knowledge Admin staff enables detailed profiling on certain areas to get to root cause after a problem has occurred. This approach works for the repeatable problems but doesn't work for the problems that are not easily reproducible. It is also very people dependent approach. If you have the right people at the right place and have all the required diagnostic data, you get the good results but that isn't the case most of the time. It is rare to have the right monitoring in place at the time of first occurrence of the problem. That makes root cause analysis an iterative process and the problem has to occur a few times before the cause is determined. On the other hand monitoring everything all the time is also not possible due to the significant overhead it causes.

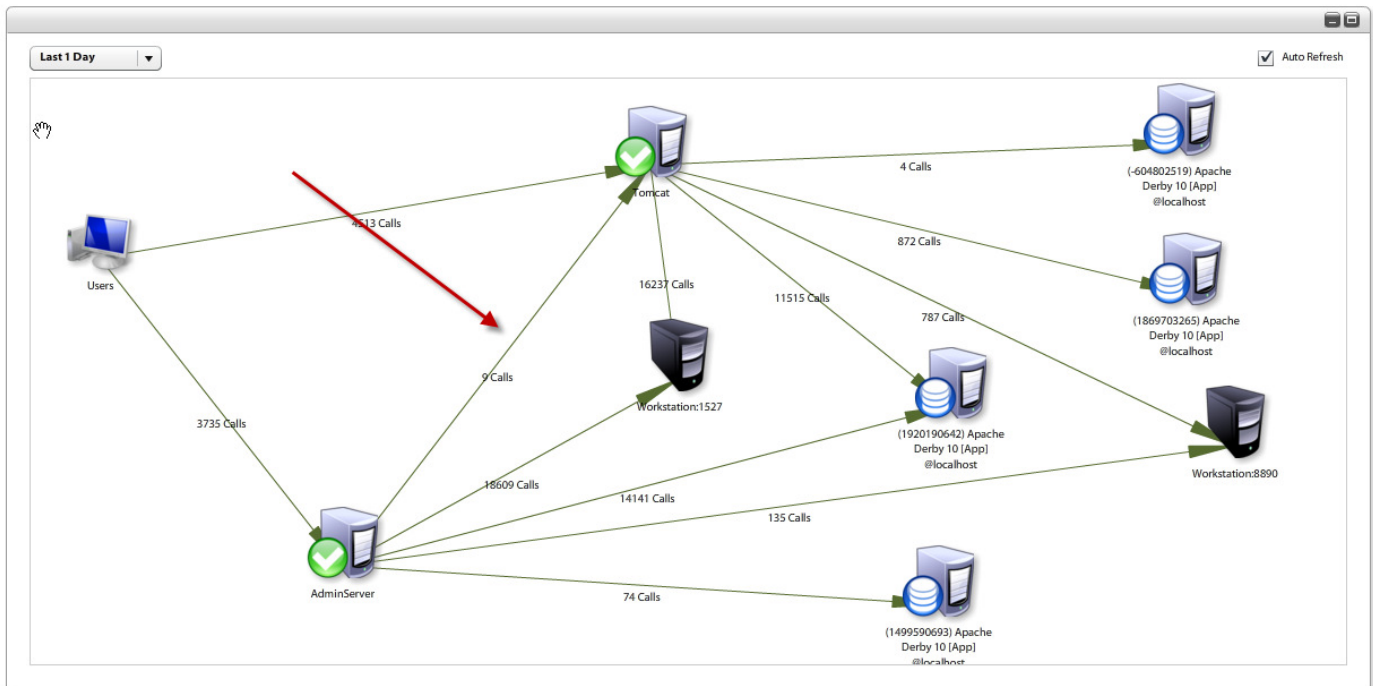
Our proactive solution to this problem is, let the expert system make the decisions on what to monitor and when. Applicare has real time adaptive monitoring and problems are automatically detected without



requiring any human intervention. Applicare senses what part of the system is developing problem, self adjusts the level of monitoring on the troubled area and auto identifies the root cause.

Application Runtime Architecture Discovery

Applicare discovers Application Runtime Architecture and builds the application blueprint. Applicare does that by automatically discovering the transactions flowing through the system and modeling interactions between various components/services and servers. It provides transactions details like # of calls, Errors, Average Time, Max Time, Min Time & SLA breach.



Applicare's Application Runtime Architecture Discovery

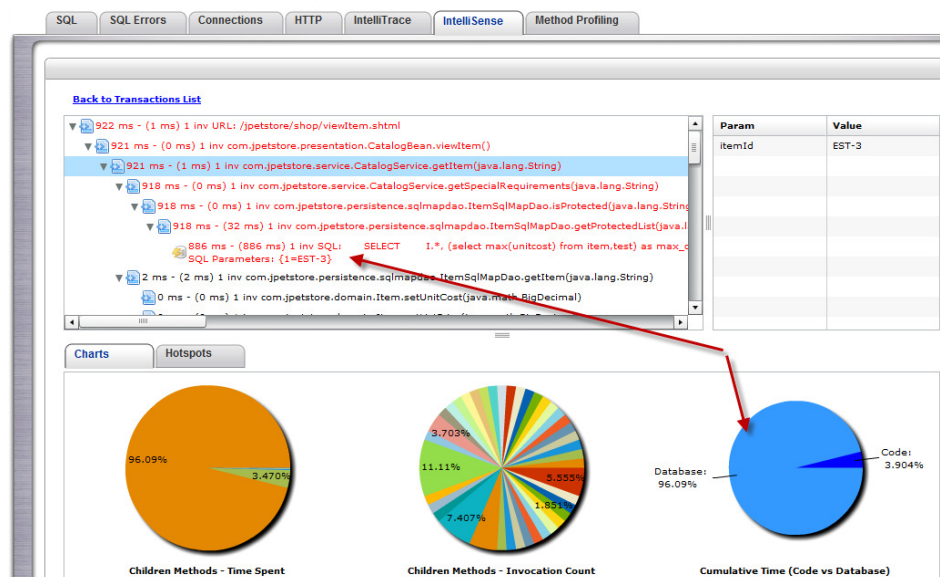
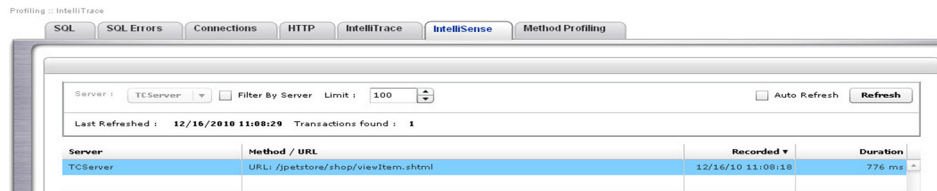
Transactions Tracing and Problem Detection with IntelliTrace and IntelliSense

Applicare keeps an eye on the whole system and builds the behavioral profile of all the transactions flowing through. It doesn't require picking and choosing of transactions that should or shouldn't be monitored. Applicare leverages that baseline to automatically detect the transactions that deviate from that. This way as and when the application behavior changes, Applicare is able to detect that and gather detailed information needed for resolution without any human intervention.

You may have millions of transactions going through your system and you don't want to gather Nth level tracing and profiling details on each one of them. It would unnecessarily cause overhead on the system and will generate a lot of noise for you to swift through. Applicare automatically and in real time decides what transactions are deviating from the norm and stores the complete details including stack, method parameters, sqls, bind variables etc. only for those transactions. Net result is you get the rogue transaction's details with minimal overall performance impact.



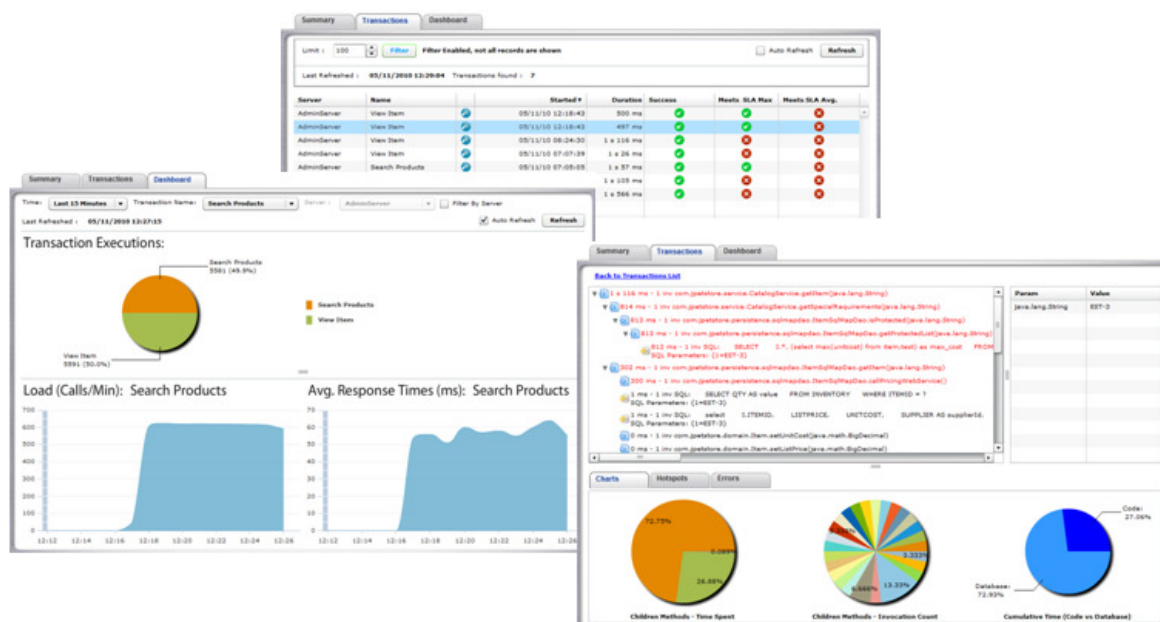
Applicare IntelliSense & IntelliTrace answer what to monitor, to what extent and when. IntelliSense identifies the rogue transactions and stores the details on them. IntelliTrace works similar to IntelliSense but at the lower level. It decides what methods should be profiled and how deep the profiling should be. A combination of these two technologies makes Applicare monitoring adaptive. Since Applicare decides in real time what details to store and to what extent, it doesn't have to monitor all transactions to Nth level all the time. Applicare using its embedded knowledge only selectively monitors and that reduces overall overhead of monitoring significantly.



Setting complex thresholds, rules and limits associated with static monitoring solutions are un-necessary with Applicare.

Business Transaction Monitoring (BTM)

Applicare Business Transaction Monitoring (BTM) lets you monitor every single individual execution of transactions important to your business. You can adjust the level of monitoring from very high-level performance stats to very detailed performance stats where all performance data, including full call graphs is saved. Applicare BTM can track transaction that span multiple servers and will show the consolidated call graph consisting of executions on multiple servers in a single UI.



Easy Business Transactions Monitoring

Performance Overhead of Appicare

One important aspect of Appicare transaction monitoring, compared with other similar profiling solutions, is its very low overhead—even at this detailed level of performance data gathering.

No instrumentation

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	KB/sec	Avg. Bytes
HTTP Request	16700	256	3	1207	163.39	0.00%	96.9/sec	452.31	4777.7
TOTAL	16700	256	3	1207	163.39	0.00%	96.9/sec	452.31	4777.7

IntelliTrace & BTM with no stack capture

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	KB/sec	Avg. Bytes
HTTP Request	16198	256	3	1812	161.97	0.00%	96.9/sec	453.23	4790.4
TOTAL	16198	256	3	1812	161.97	0.00%	96.9/sec	453.23	4790.4

IntelliTrace & BTM with full stack capture

Label	# Samples	Average	Min	Max	Std. Dev.	Error %	Throughput	KB/sec	Avg. Bytes
HTTP Request	17355	257	3	1934	163.46	0.00%	96.5/sec	451.63	4790.2
TOTAL	17355	257	3	1934	163.46	0.00%	96.5/sec	451.63	4790.2

The above image shows the performance of a web application running on a Java application server with:

- No instrumentation,
- IntelliTrace & BTM enabled (with no stack capture), and
- IntelliTrace & BTM with full stack capture.

This shows that even with IntelliSense and BTM enabled, there is no noticeable difference in throughput (**96.9/sec vs 96.5/sec**).

Appicare achieves this very low overhead by **intelligently adjusting how deep it goes into a call graph during run-time and what transactions to monitor**. It will **not** gather data for methods that take very little time to execute, compared to the overall transaction. Similarly Appicare doesn't gather data for transactions that fall under normal category based on automatic behavior profiling. This reduces the overhead significantly.

Appicare doesn't force you to use IntelliTrace and IntelliSense. You can completely disable these and take a more manual approach by defining what to monitor and when (just in case you like manual approach..).

End User Experience Monitoring

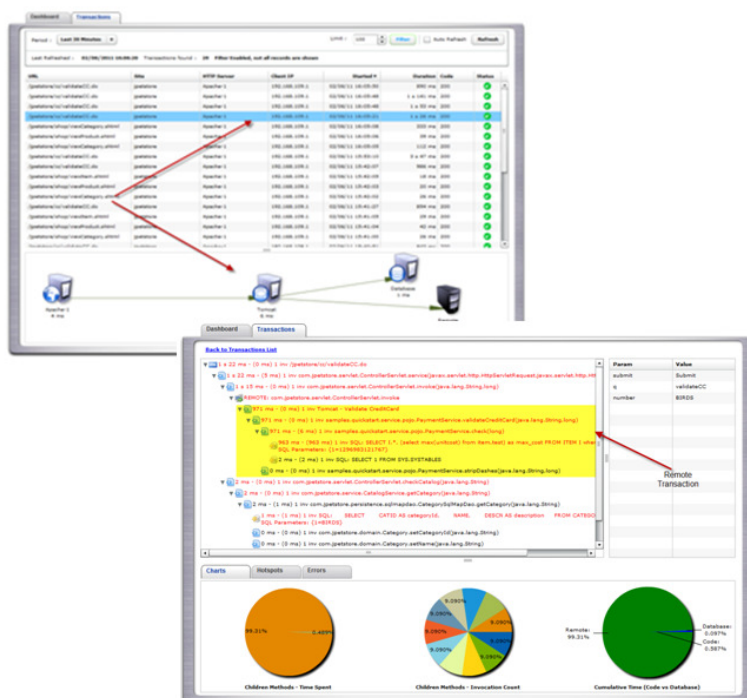
Appicare provides multiple ways to monitor End User Experience.

Synthetic Transactions

Appicare Synthetic Transaction Monitor helps detect and warn performance issues as soon as they occur and generally well before users are impacted. When combined with Business Transaction Monitoring and/or IntelliSense, you can diagnose and pinpoint the issue all the way to the individual method/SQL in your code.

Real User Experience Analysis

Appicare Real User Experience Monitor tracks the performance of your production applications for real user interactions.



Real User Experience Monitoring with Nth level details

Automate Expert Configuration Analysis

Appicare can analyze the environment, identify areas where there is room for improvement and can either automatically fix the issue or advises on the fix. So, instead of spending countless hours mired in the tuning process, your staff can spend their time on more productive tasks.

Appicare analyzes your entire server environment's configuration, including your server's configuration and deployed applications. It generates a comprehensive, meaningful, and detailed report of recommendations. Appicare uses embedded knowledge that our performance experts gathered to illustrate where you are not leveraging your server's environment correctly. Then, it provides guidance on how you can resolve those issues and achieve optimal performance.

Appicare also guides by using best practices, and provides specific examples and areas in your environment where you can benefit most from applying them. This automated guidance is equivalent to having a team of performance experts evaluate your environment and provide feedback on how well you are leveraging your infrastructure.

Appicare takes performance tuning and problem resolution automation to a new level by providing the framework for fixing common performance issues with built-in knowledge. Appicare can automatically make adjustments to your configuration, based on your own custom knowledge or its embedded expert knowledge. In addition, Appicare provides methods for knowledge input that all can use—from novices to experts, engineers, and developers. Appicare's recommendations are specific and actionable.

JDBC Shrinking Enabled	You have JDBCShrinkingEnabled for Connection Pool. This causes pool to shrink when there is less load on the server and users will have to wait for new connections creation when load rises. In our opinion from performance stand point this defeats the purpose of connection pooling.
Recommendation Area: MedRecGlobalDataSourceXA	
JDBC Shrinking Enabled	You have JDBCShrinkingEnabled for Connection Pool. This causes pool to shrink when there is less load on the server and users will have to wait for new connections creation when load rises. In our opinion from performance stand point this defeats the purpose of connection pooling.
Type= JMServer, Server= MedRecServer	
Recommendation Area: Appicare-JMServer	
No JMS Persistence	No Persistence Mechanism is used for JMS Server Appicare-JMServer. We recommend use of file persistence. File Persistence is much faster than JDBC Persistence. You can get more details on it at Click here for more details
Recommendation Area: MedRecJMServer	
JDBC as JMS Persistence Type	JDBC Persistence is being used for JMS Server MedRecJMServer. JDBC Persistence is much slower than file persistence and is not recommended. You can get more details on it at Click here for more details
Type= Server, Server= MedRecServer	
Recommendation Area: Server-0	
Server Staging Mode	You have applications deployed with stage mode. Consider nostage mode to avoid the overhead of copying large files to multiple servers. For more details see Click here for more details
Recommendation Area: ms1	
Server Staging Mode	You have applications deployed with stage mode. Consider nostage mode to avoid the overhead of copying large files to multiple servers. For more details see Click here for more details
Type= WebAppComponent, Server= MedRecServer	
Recommendation Area: admin	
Servlet Reload Period	It is recommended to turn servlet reloading off for production. It may be cause severe performance penalty if this value is set too low. Current value

Appicare's recommendations are specific and actionable.

Legacy Systems Monitoring

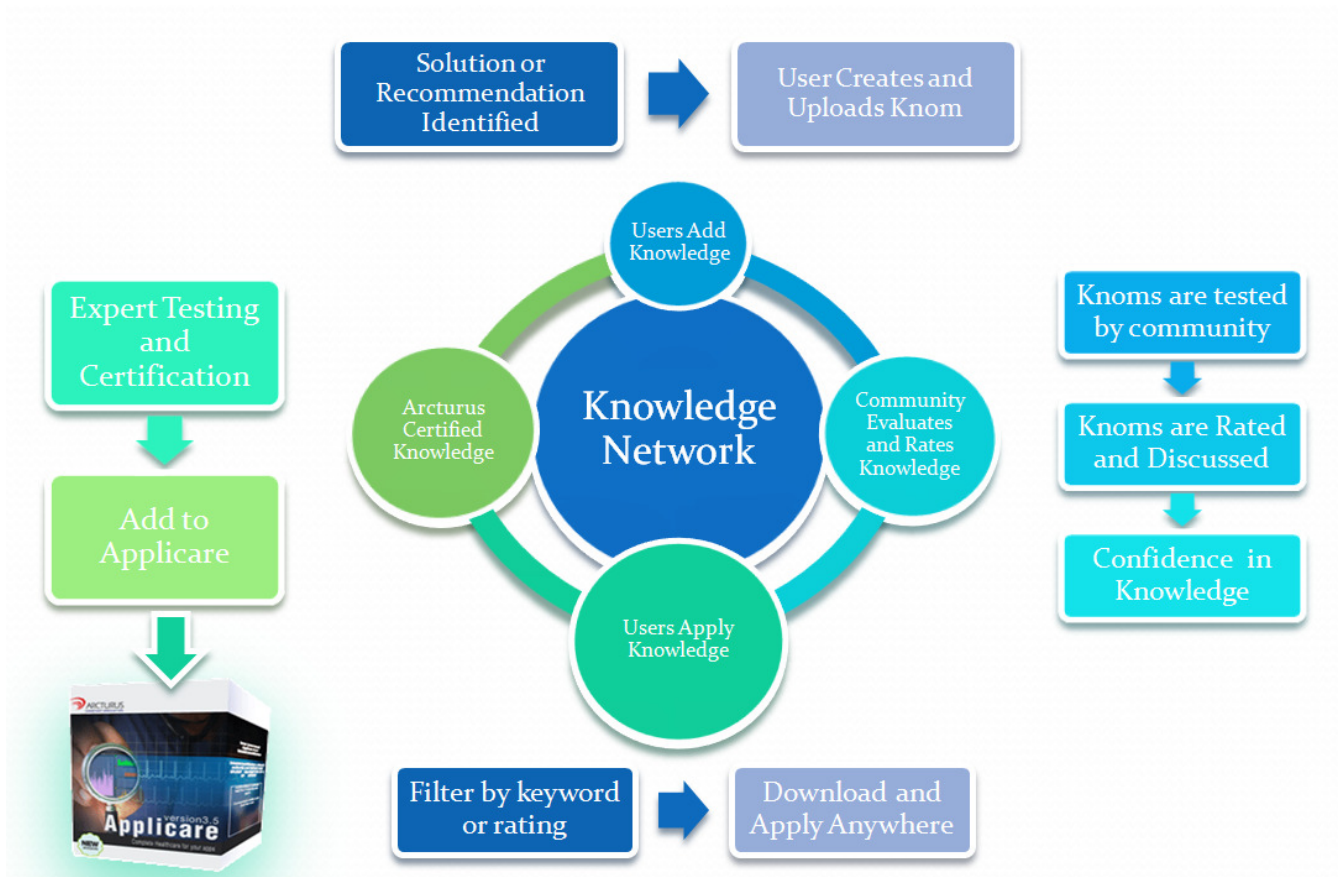
Another feature that comes handy when dealing with legacy systems is Appicare's BTM integration with Log Monitoring. This gives an easy way to find data in log files that relates to a certain transaction. Just right click on the parameters passed to a method and Appicare will find the data in the log files for that parameter at the time of the transaction.

Knowledge Sharing

Arcturus Appicare is built upon the concept of an expert system. At the time of founding Arcturus, our experts gathered our knowledge and built that into Appicare. This way we were able to apply collective knowledge on the touch of a button and results were amazing. No more dependence on the individual experts. We took this concept and opened it up to the whole world. Now with the help of our patent pending framework Knoms (short for Knowledge Modules) and social knowledge network - KnomBank, any expert anywhere in the world can build knoms and share/demonstrate their expertise on KnomBank.com.

Knoms are a way to build knowledge that is executable and sharable. This knowledge can be best practices or patterns causing problems. Knoms allow preventing outages & performance slowdowns from the known patterns. With KnomBank.com we have opened up knoms to the whole world and any expert in any part of the world can share/demonstrate their expertise. We have 1000s of members on KnomBank from almost all the continents. Once a pattern is discovered anywhere in the world and shared on KnomBank, Arcturus certifies that pattern and sends it to Appicare via knowledge update.

Knoms can be build on any property or combination of properties that is accessible via JMX or SNMP.



Summary

In today's economy, your organization must find innovative solutions to improve performance and stability while cutting costs. Appicare provides a performance management solution that not only generates instant ROI, but also helps you improve performance over time. This reduces the frequency and duration of costly outages.

Appicare prevents problems that might occur in your system. By automatically analyzing and detecting, it simplifies the entire process to just a few clicks—providing better performance and resource utilization. With Appicare, you can become proactive in your task to keep application performance at its peak (because you and your customers cannot afford the outages and downtimes that come from being reactive).

Appicare intelligently measures application performance, auto analyzes and auto tunes your environment, and proactively warns of system downtime symptoms and their probable causes before your customers are impacted. With Appicare™, Arcturus Technologies takes enterprise application performance management to the next level, with predictable and peak-performing SOA environments. Know exactly who is impacted, why, and when – and how to find a solution to this situation.

The financial savings from automating the diagnosis and detection of performance problems add up quickly when you have fewer outages, better performance, self detection and proper hardware usage.

To request a free demo, visit <http://www.arcturustech.com>, or contact sales at 866.262.7971 or 703.822.4582 (from outside US).

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