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PROACTIVE MANAGEMENT OF CUSTOMER NETWORKS FOR STABILITY AND RELIABILITY LEVERAGING APPDY INTEGRATION INTO NETWORK SERVICE PRODUCTS

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ABSTRACT

Techniques are described for leveraging the integration of the AppDynamics (AppDy) Software Development Kit (SDK) with network service products that allows for run-time retrieval of key process data on an AppDy platform. The run-time retrieval of key process data will be managed by a network service provider's customer support teams, which can proactively detect customer network degradations before they have an impact on end user experience.

DETAILED DESCRIPTION

Network service providers are experiencing an increasing complexity of network deployment due to the expansion of Internet of Things (IoT) environments. While networks are getting more complex a network service provider's goal is to make it simpler for its customers to manage their networks. Normally, a customer could deploy a network via its network administrator (admin) and, in case of trouble, the network admin could contact the network service provider's customer support teams for help. Figure 1 illustrates details associated with a typical customer support engagement scenario.

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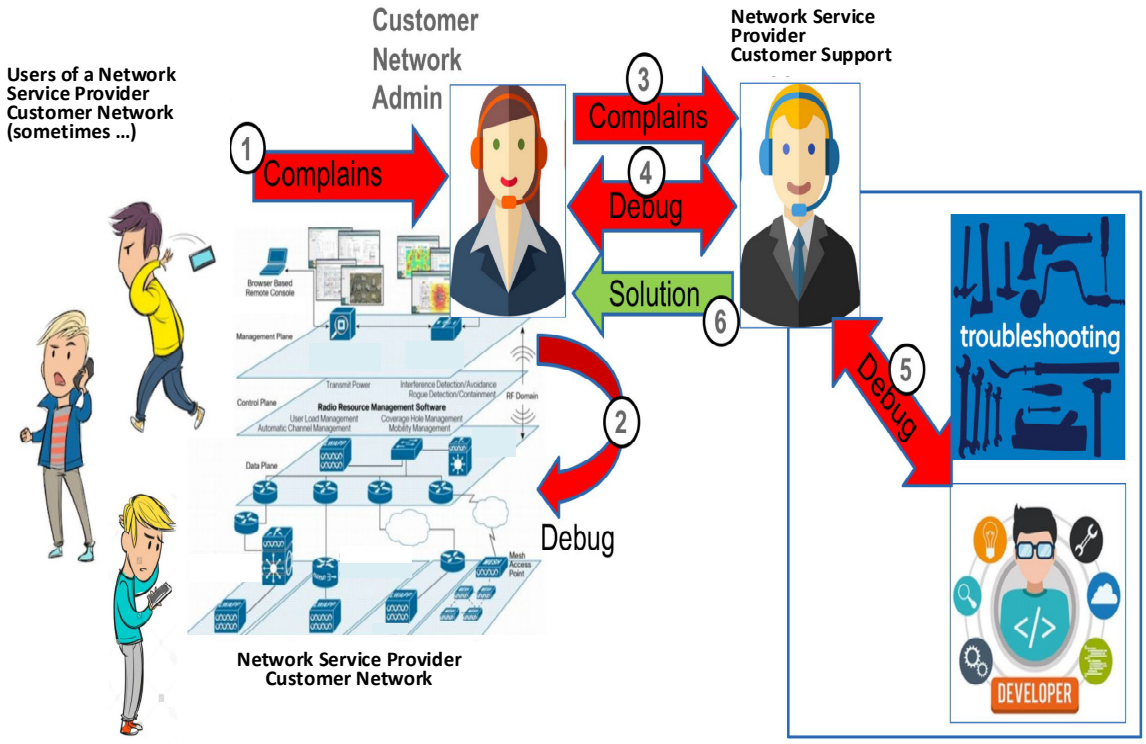

Figure 1

For Figure 1, a normal customer support engagement scenario may be as follows:

1. Users of the customer network begin experiencing network issues and they start complaining to the network admin.

2. The network admin starts debugging the network to see if the issue can be fixed.

3. If the fix is not straightforward, the admin calls the network service provider's customer support for help.

4. The customer support team debugs the network with the network admin.

5. In some cases, engineering is also engaged to help.

6. Finally the solution is found and deployed to the customer network.

The above approach has the following issues:

- The actions are reactive – the network service provider is called in when a customer is already experiencing a significant network impact.
- This can cause high operating expense (OPEX) costs both for the network service provider and its customers due to:
    - Time spent by the customer's network admin.

  - Time spent by network service provider's customer support.
  - Time spent by engineering to help customer support, if needed.
  - Network downtime cost for customers and Service Level Agreement (SLA) impacts for the network service provider.
- Additionally, this can create a stressful environment in which to troubleshoot and debug.

This proposal addresses these issues by moving the trouble shooting process between a customer and a network service provider from a reactive engagement to a proactive engagement by leveraging AppDy within network service products. Figure 2 illustrates features associated with this proposal.

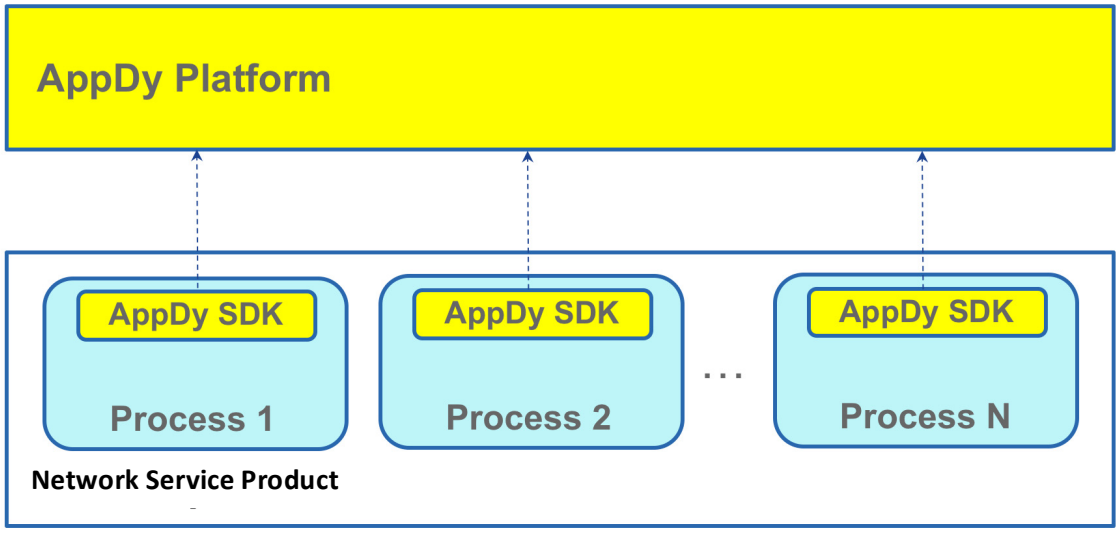

Figure 2

In particular, this proposal can be achieved by:

1. Leveraging the AppDy Application Performance Management (APM) controller, which has the ability to monitor various business transactions between Tiers and nodes.
2. Modelling the critical functional flows within network service products as business transactions.
3. Integrating the APM AppDy SDK with the key processes within network service products that are part of an identified critical business flow.
4. Identifying the functional flow start and end as an APM AppDy SDK business transaction start and end.

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5. Using APM AppDy SDK exit calls to track various communications.

With the above performed, the APM AppDy SDK embedded in network service processes could:

1. Monitor the functional flows and export statistics about the business transactions, thereby enabling the AppDy APM controller to represent the functional flows and depict various timing measurements.
2. Provide enabling snapshots that could dive into certain instances of business transactions and look at anomalies observed.
3. Export key data such as Central Processing Unit (CPU) data (e.g., load, etc.), performance data, or the like.

Performing these operations will provide a live view of how a system is behaving while it is deployed and in use. For example, it is analogous to having wearable health monitoring devices presenting health stats in the context of network service products.

Figure 3 provides a visual representation of a proof of concept (POC) use-case involving a network service wireless controller in which various sub-flows are tracked within Wireless Client Authentication processes. The bold lettering in Figure 3 highlights the flows being monitored.

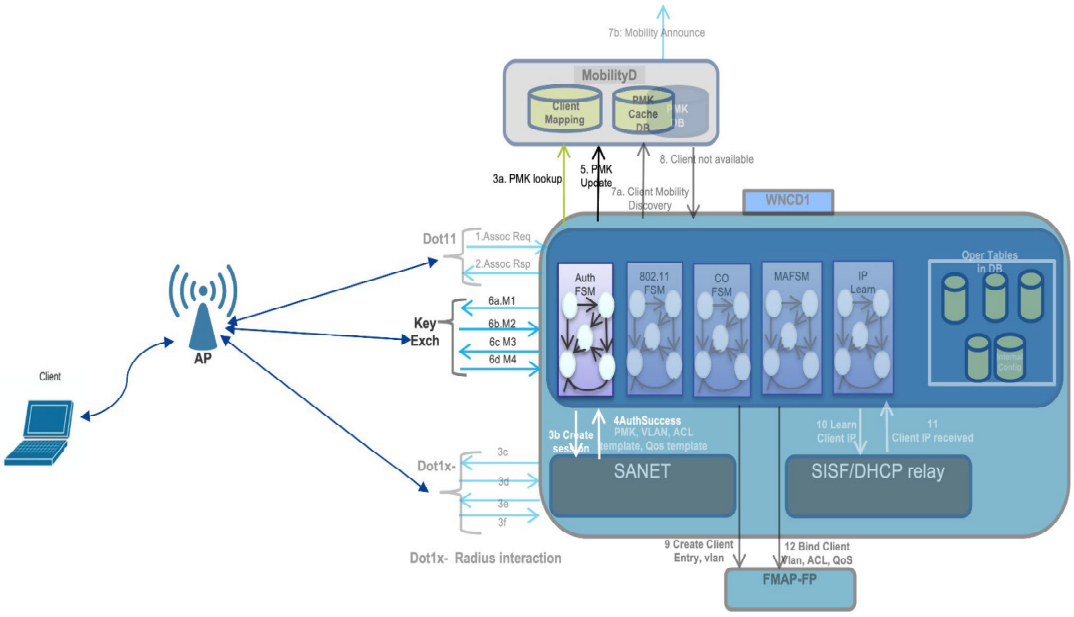

Figure 3

A snapshot of the visual representation of Figure 3, as observed on the AppDy Controller, is illustrated below in Figure 4.

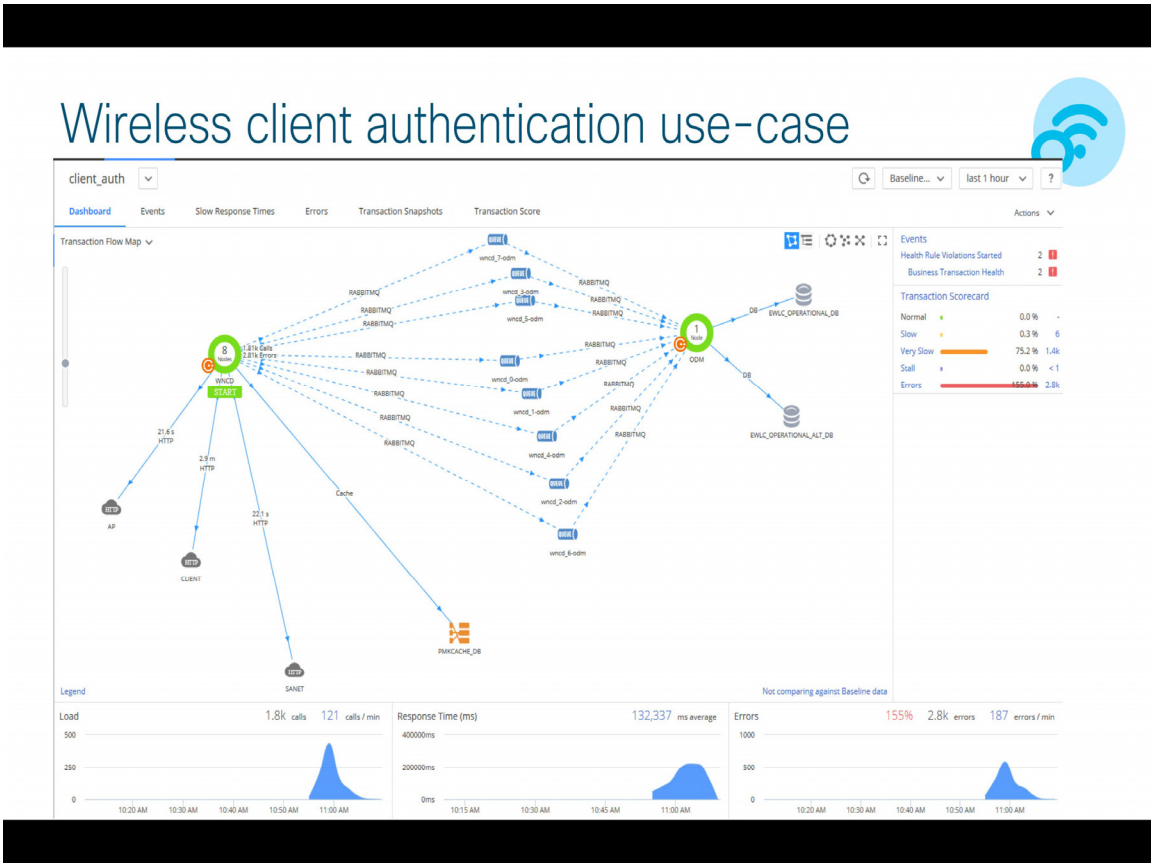

Figure 4

Figure 4 illustrates the following:

1. Various instances of wncd processes (the daemon managing wireless clients and Access Points (APs)) and corresponding communications to an AP, a Client, and a Session Aware Networking (SANET) module.
2. Replication of operational information via an Operational Data Model (ODM) server to an operations database (EWLC_OPERATIONS_DB).

It is to be understood that the snapshot illustrated in Figure 4 is provided to give a glimpse of the kind of granularity that can be customized and visualized using this proposal and is not meant to limit the broad scope of this proposal. The snapshot does not capture the full potential of the AppDy integration for network service products that can be provided by this proposal.

Figure 5, below, illustrates example details associated with this proposal in which the overall customer experience is made proactive rather than reactive (as shown above in Figure 1).

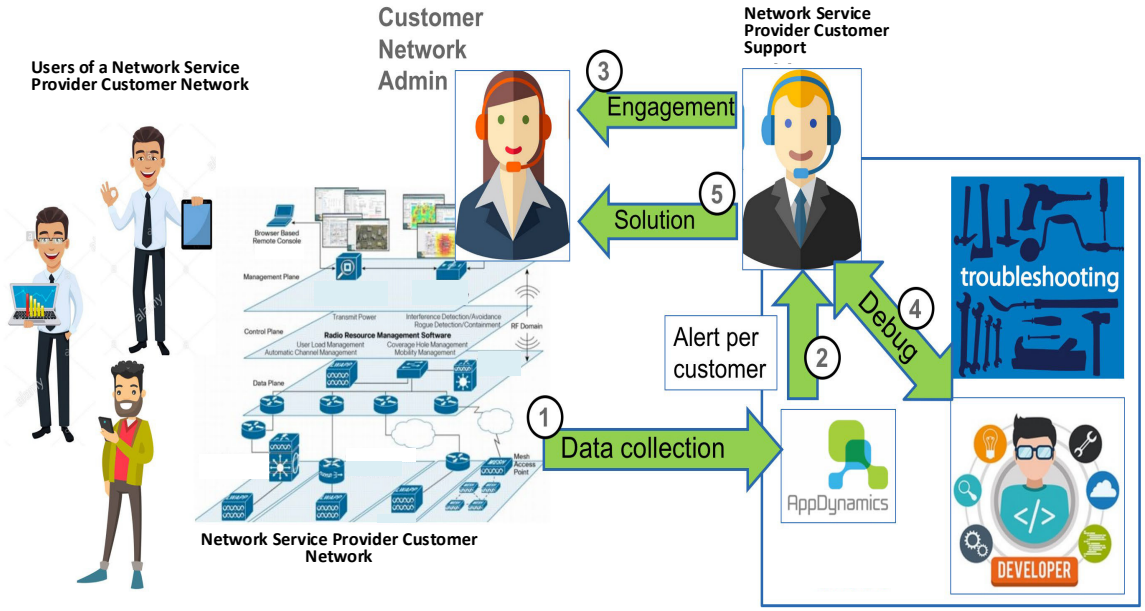

Figure 5

For Figure 5, a proactive customer experience can be provided as follows:

1. Key data will be periodically exported from the network service products of a complex network to the AppDy servers that could be managed by the network service provider via customer support teams.
2. When anomalies are detected, the customer support teams can be alerted.
3. The support team can then contact the customer before the triggered anomaly produces a real network issue at a customer site.
4. Debugging can happen is a less stressful environment.
5. A solution can be provided to the customer before a real network issue occurs.

Thus, the overall customer experience would be improved by this proposal for the following:

- Proactive detection of anomalies by a network service provider is provided.
- The resolution flow is changed: the network service provider calls the customer, not vice versa.

- Optimized OPEX is achieved for both the network service provider and its customers.
- End users have not yet experienced network issues.
- Troubleshooting and debugging is performed in a less stressful environment for both the network service provider and its customers.

In summary, techniques are described herein for leveraging the integration of the AppDy SDK with network service products that allows for run-time retrieval of key process data on an AppDy platform. The run-time retrieval of key process data will be managed by a network service provider's customer support teams, which can proactively detect customer network degradations before they have an impact on end user experience. This will change the trouble shooting process from a customer calling (in a stressed situation) a network service provider to the network service provider calling a customer before the customer's network users experience any troubles and proposing a solution.