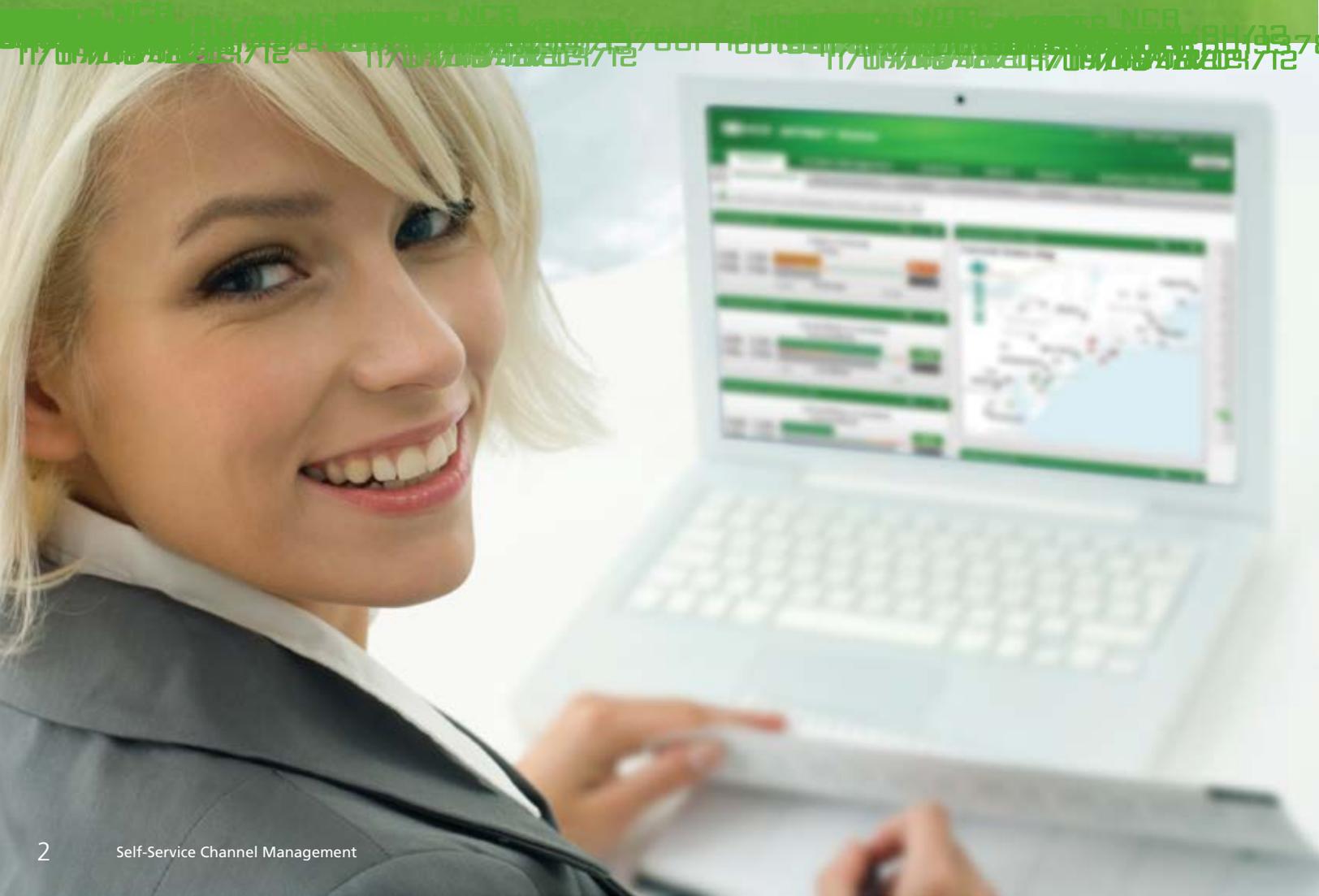


Whitepaper overview

Performance problems found in today's complex multi-channel retail banking environments often have multiple characteristics. It is not uncommon for them to also have more than one point of bottleneck or breakdown. The right combination of self-service device management, cash management and end-to-end transaction monitoring, enables IT and channel operations teams to embrace enterprise-wide performance awareness, and take a holistic approach to managing their multi-channel banking environments. When combined together, these solutions will reduce silo mentality and make performance information readily accessible to those who need it. This will lead to exceptional service delivery, greater operational efficiencies and a better leveraging of IT investments across multiple channels, services and operations units.

A combined solution offering of NCR APTRA™ Vision, NCR APTRA™ OptiCash and INETCO Insight® will help financial institutions increase service availability, optimize cash replenishment, and improve the performance of their self-service networks. This paper will explore product synergies and explain how these products can be deployed and integrated together to provide a holistic vision that is more valuable than the sum of its individual parts.



A shift to enterprise-wide performance visibility

In today's multi-channel retail banking environments, business opportunities and risks are constantly changing. New end customer demands, expanding self-service delivery channel options and more diverse service offerings are translating into exponential growth when it comes to electronic transaction volumes.

Changes such as these are making it more difficult for IT and channel operations teams to provide reasonable assurance to business leaders and management that device performance, cash management and the performance of consumer's transactions are not in risk of degradation or failure. The onus resides with these teams to prove they have the agility, oversight and control needed to drive continuous service improvement, identify priority service risks and manage an increasingly complex operating environment—all in a cost effective way.

Shifting ground for IT and channel operations teams

Traditionally, each delivery channel operated in its own separate silo of automation, with limited customer transactions flowing across multiple channels. But today's payments and value added service (VAS) transactions often flow across multi-channel enterprise environments made up of many customer-focused technologies, modern service-oriented (SOA-based) architectures, virtual data centers, mobile platforms, web-based infrastructure and core legacy banking systems.

We are living in a banking world where a customer may start a cash withdrawal transaction on their mobile phone and want to complete it later at an ATM. The ability to schedule appointments, order foreign exchange, or respond to sales offers using an online banking channel or an interactive ATM channel is another example, with the requested service being completed at the branch.

Financial institutions that may have once been reliant on a single core banking application now run dozens of critical applications across a number of global channels, including ATM, mobile, online, call centers and branch environments.

Gone are the days of a predictable, monolithic, slow-changing single application environment. Today's multi-channel banking environment replaces this with a distributed, shared and rapidly changing environment that makes it extremely difficult for disjointed operations teams to integrate channels and services, and isolate performance issues in a time-effective manner. As a result, consumer experiences are often disconnected, cumbersome and disappointing. To quickly identify and control the impact of device, infrastructure, application-component or cash management problems in the context of the consumer experience requires banks to take a fresh approach to enterprise-wide performance awareness.

A time to be proactive, think systematic and embrace holistic

Shifting to enterprise-wide performance awareness requires banks to have a systematic process for anticipating new and emerging performance issues anywhere, anytime. This means real-time, hop-by-hop visibility over the entire life cycle of every consumer transaction—be it from one customer-focused technology to another, through to the payment processing or core banking system, out to a back end banking, EFT or third party service provider connection.

Achieving enterprise-wide performance awareness also requires financial institutions to adopt a holistic, cross-correlated view into their entire portfolio of customer-facing devices, cash demand services, critical applications that are scattered throughout a bank's business systems, network infrastructure and third party response times. This is what operations teams need to predict consumer transaction patterns, reduce unacceptable performance variability and deliver a consistent consumer experience across all channels in an efficient, cost effective way.



Responding through innovation

As financial institutions continue to reinvent their customer experience, NCR and INETCO® are working together and reinventing how to manage more dynamic cash demands, more customer-focused technologies and more multi-channel consumer transactions in an efficient, cost effective way. NCR's experience in self-service device management and cash management, combined with real-time transaction intelligence from INETCO, will give financial institutions a unique, one-stop source of enterprise-wide performance analytics that will help them:

- Accept more electronic consumer transactions and customer-focused technologies while maintaining control over cash management, device performance and service delivery
- Deliver a seamless customer experience across multi-channel banking environments
- Achieve greater operational efficiency through 65–75% faster problem isolation
- Gain more leverage of IT investments across multiple channels, services and operational groups
- Continually optimize replenishment strategies to maintain the lowest cost of cash operations

Scoring your first technology Hat-Trick

NCR makes it easier and more cost effective for organizations to deploy a combined, "one-stop" management solution that covers device performance, real-time transaction monitoring and cash management. Three unique products represent the NCR enterprise-wide performance awareness solution.

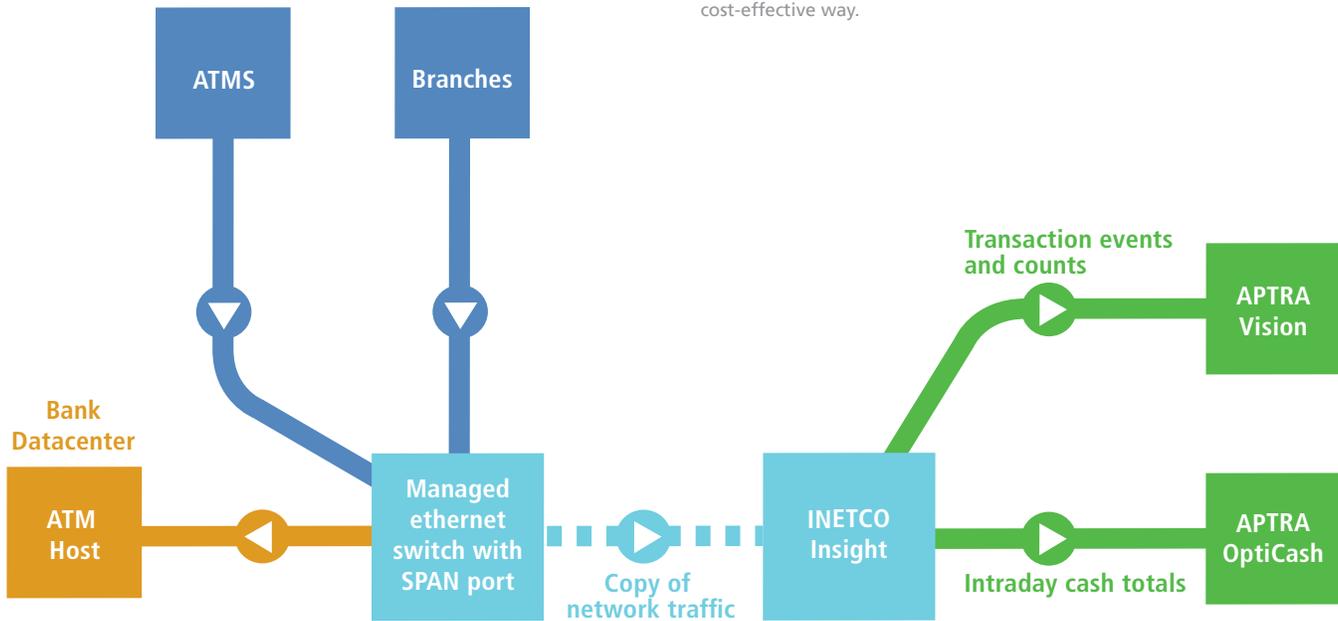
NCR APTRA Vision is multi-vendor management software used by leading organizations across the globe to monitor the performance of their ATM and other self-service devices. Built on over 20 years of deep industry experience, NCR APTRA OptiSuite delivers sophisticated cash management, forecasting and optimization technology for the entire cash supply chain. Real-time transaction intelligence feeds and innovative cross-correlation of application, network, and device performance data is achieved with the INETCO Insight transaction-centric monitoring software.

Deployed and integrated together, these software solutions can interact with each other, share common data and provide unparalleled visibility into enterprise-wide performance across your multi-channel banking infrastructure.

NCR is the only software provider that can offer an integrated solution to meet self-service device, transaction monitoring, and cash management needs within a multi-channel retail banking environment.



A “one-stop” management solution that covers device performance, real-time transaction monitoring, and cash management. By integrating APTRA Vision, APTRA OptiCash and INETCO Insight into a combined management solution, financial institutions can gain full self-service channel performance visibility in a cost-effective way.



APTRA Vision—self-service device monitoring and inventory management

The core value proposition of NCR APTRA Vision is built around ensuring that all self-service devices, such as ATMs, are meeting the needs of the end customer.

APTRA Vision draws status information alerts, through the traditional switching route or using advanced agent technology, to provide visibility into the health of each ATM or self-service device in the network. It is the ideal solution to monitor heterogeneous ATM networks where a mixture of devices from different vendors is the norm.

Actionable metrics are provided for key performance indicators such as ATM or self-service device availability, incidents, cash monitoring, unserved customers and total number of withdrawal or deposit transactions. This data enables financial institutions to continuously monitor the performance of their self-service devices, speed up and automate problem diagnosis, reduce downtime and ensure that any disruption to ATM or self-service device availability is kept to an absolute minimum.

APTRA Vision provides comprehensive inventory and performance management for your multi-vendor self-service network.

INETCO Insight—end-to-end transaction monitoring for multi-channel banking environments

INETCO Insight is a proven, real-time transaction monitoring solution specifically designed to identify why consumer transactions slow down, time out or fail. It has the unique value of monitoring transactions rather than devices. INETCO Insight is widely utilized as a real-time transaction analytics feed that can decode and forward status messages into systems such as APTRA Vision, or APTRA OptiCash, enabling organizations to profile customer experience, application and network metrics for every transaction.

INETCO Insight's award-winning user interface and advanced protocol decoding engine also makes it attractive to run as a stand-alone product to optimize the seamless delivery of services across single delivery channels, critical banking applications and integrated multi-channel banking environments. Within their first year of deploying INETCO Insight, financial institutions have reported up to a 26% reduction in failed customer interactions and a 65–75% faster isolation of transaction performance issues.

INETCO Insight is also the fastest deploying transaction management solution in the financial industry. Its horizontal, network-based deployment approach removes a major hurdle that has traditionally restricted banks from accessing the break-down of response times for all self-service network components, third party and back-end connections to truly improve service delivery. Organizations can now gain visibility

into how all parts of a self service system management solution are performing with zero overhead—no agents, extra traffic loads, or code changes required, inclusive of any modifications to the switch.

APTRA OptiCash—advanced cash forecasting, process automation, and optimized cash handling

According to the ATMIA, the management of cash accounts for nearly 30% of an ATM's annual expenses. They also estimate that effective cash management strategies can save a financial institution from \$3,000–\$10,000 a year within a branch.

NCR APTRA OptiCash is an advanced cash management solution combining advanced forecasting technology with detailed contract and cost modelling and a powerful real time optimization engine to identify the replenishment strategy with the lowest total cost of operation. OptiCash customers realize considerable savings through reduced cash inventories, virtually no cash outages, significantly reduced requirement for emergency cash orders and improved customer availability. In addition OptiCash provides substantial administrative efficiencies by automating routine tasks, eliminating human error, providing simulation support for decision making as well as advanced reporting providing complete transparency to the key stakeholders.



Exploring product synergies

APTRA Vision and OptiCash

Coupling APTRA Vision information with data drawn from APTRA OptiCash can significantly enhance an organization's potential to minimize cash low scenarios, avoid extended downtime at a cash point, and control the usually higher costs of an unscheduled emergency replenishment.

Improve cash forecasting and cash replenishment accuracy at any cashpoint

Operational information about an ATM's performance, location, access hours, and cash servicing company goes hand in hand with cash forecasting and cash replenishment information. APTRA Vision shares alerts to cash low or cash out situations, and provides APTRA OptiCash with valuable source data for its cash forecasting algorithms and complex statistical analysis.

Reported at a denomination or a cassette level, this information can be combined to minimize downtime and give operations teams a precise view of cash holdings and actual past withdrawal totals for every ATM and alternative cash point, throughout your ATM channel. Operations teams can also guarantee instructions to cash in transit service providers are dispatched wisely and cost effectively.

Downtime can have a significant impact on the withdrawal and deposit patterns of any cash point. APTRA Vision is able

to pass this precise downtime information to APTRA OptiCash to modify cash forecasts and statistical analysis accordingly. Validating withdrawal data can now be fully automated.

The integration of APTRA Vision and APTRA OptiCash also enables operations teams to forecast withdrawal demand and cash replenishment schedules with an enhanced degree of accuracy. Data such as seasonal variations (time of month, holidays, etc.), the degree to which regular withdrawal demand fluctuates, replenishment lead times the length of replenishment periods and periods of ATM downtime can be used to design automated rules and logic that determines whether the day's data is to be excluded or somehow modified in forward planning.

Quickly eliminate manual miss-keyed replenishment data errors

Drawing on confirmed orders captured in APTRA OptiCash, planned replenishments can be further validated to ensure amounts are correctly keyed in by replenishment staff. Replenishment discrepancies can be immediately identified using APTRA Vision, allowing operations teams to quickly correct miss-keyed data and minimize the likelihood of cash run outs.



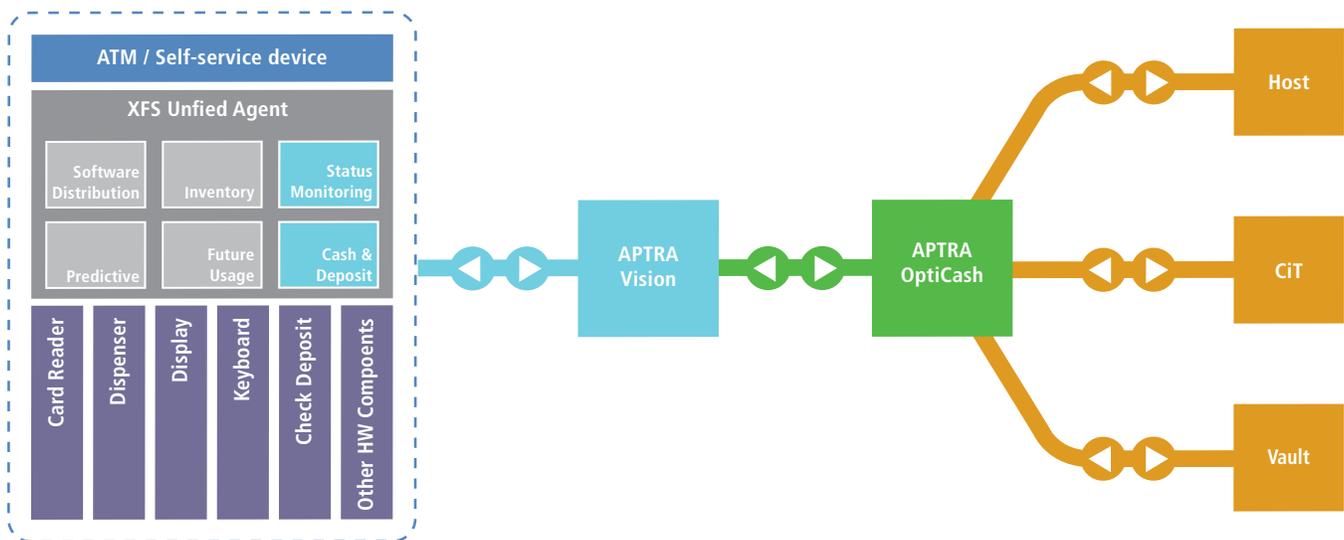
Alternatively, by integrating APTRA Vision and APTRA OptiCash, it is also possible to reduce miss-keying errors and speed up the overall replenishment process by automatically passing the planned replenishment amounts directly to the ATM. This would enable the replenishment staff to see the planned amount on screen and simply confirm these figures instead of undergoing a manual process.

Make information easily accessible for all who need it

ATM changes and updates can have an impact on both operational monitoring and other areas such as longer term cash management and planning. This is why information should be made easily accessible for all operations and cash forecasting teams who need it. By integrating APTRA Vision and APTRA OptiCash directly, the operations team is able to see details of the next scheduled service. They can establish

rules and logic so that APTRA Vision can automatically process cash low alerts such as deciding to defer any immediate action, knowing that a planned replenishment is imminent, or escalating matters where a cash run out is likely and no replenishment due.

APTRA Vision can be set up to alert the correct team to a range of cash management situations, providing a streamlined path to escalation and a minimal impact on cash point downtime. The integration of APTRA Vision and APTRA OptiCash will result in better service delivery, IT investment leverage and operational efficiency through the sharing of information databases.



APTRA Vision shares alerts to cash low or cash out situations for each individual cashpoint, and provides APTRA OptiCash with valuable operational data such as ATM downtime for its cash forecasting algorithms and complex statistical analysis.

APTRA Vision and INETCO Insight

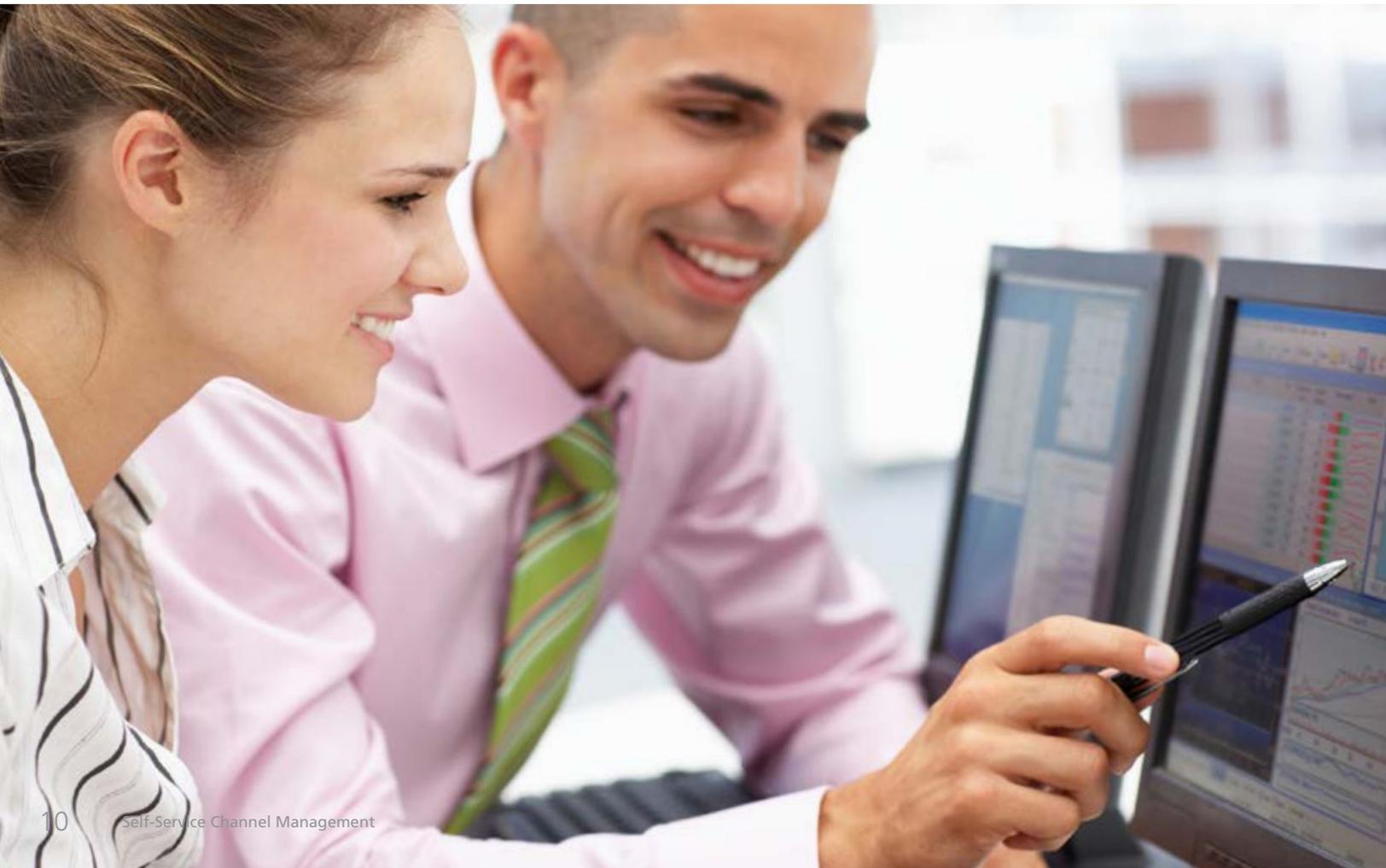
INETCO Insight captures deep transaction intelligence for every customer interaction, presenting the opportunity for APTRA Vision users to extend knowledge beyond ATM availability, and add a new dimension of multi-channel problem resolution to their management system. By decoding status messages and passing detailed real-time event alerts and analytics directly to APTRA Vision, operations teams can gain insight into how all parts of their enterprise system are performing without having to deploy more agents, extra traffic loads or switch changes. This status information can be used to trigger incidents and actionable resolution processes based on user defined rules within the management system.

INETCO Insight has been specifically configured to pass real-time transaction alerting information directly into the APTRA Vision environments. Exceeding transaction monitoring thresholds generate an alert in INETCO Insight. The alert is picked up in APTRA Vision and incidents created based on user defined rules when required.

Adopt a cost effective approach to managing service delivery

Rather than spending costly time and resources trying to decode protocols and assemble fragmented transaction information gathered from log files, expensive extract utilities, and custom application performance management programs, operations teams can simply tap into the dynamic flow of transaction data and statistics INETCO Insight produces through real-time event outputs to APTRA Vision and APTRA OptiCash, real-time syslog outputs of transaction information, or outputs of transaction details to enterprise databases (e.g. Oracle, SQL Server).

If desired, INETCO Insight can also be run as an alternative to the existing transaction aggregator and categorizer within the APTRA Vision products. INETCO Insight collects transaction information from the network via a SPAN port. Messages are decoded and correlated, then routed to the product's analytics engine, where statistics are automatically calculated. These statistics are then forwarded to APTRA Vision.





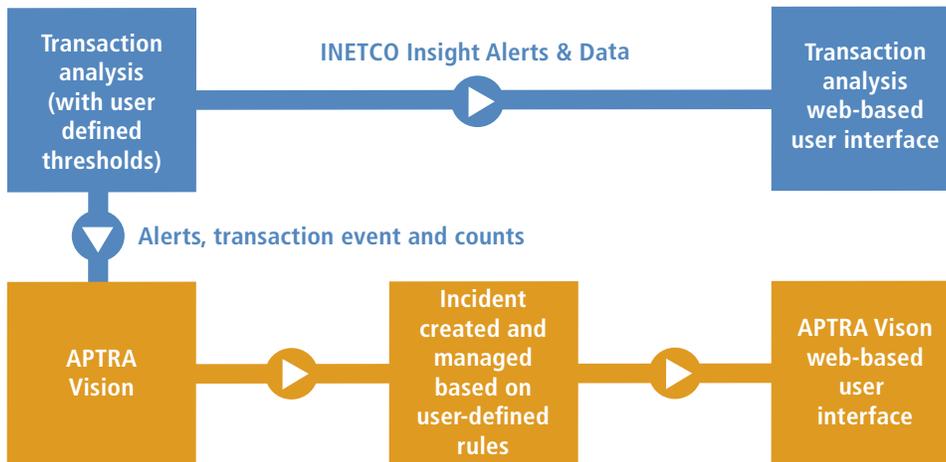
With any of these integration options, operations silos can move away from a siloed, fragmented approach and adopt a “one-stop” window where they can cross-correlate service delivery with device failures (ATM availability), network communications and application response issues. This cross correlation approach enables more efficient troubleshooting and removes the risk of device issues, service application issues, network communication errors, and transaction failures or slowdowns going undetected in today’s complex banking networks. This end-to-end solution can be running within ATM or any other self-service network environments in a matter of hours, greatly reducing the time to value.

Account for all your transactions

APTRA Vision’s ability to account for withdrawals and deposit transactions can be expanded to include accountability for all transactions, including a break down by channel, service or response codes that represent reversed, failed, unsupported and service transactions. With a deeper understanding of traffic patterns and revenue generation, incidents can be related back to revenue and the customer experience, reducing the number of unserved customers, strengthening business impact analysis and improving fault prioritization.

Extend knowledge beyond ATM availability

Through INETCO Insight’s ability to automatically correlate the response times of multiple transaction “hops”, operations teams can look beyond the self-service device, and isolate performance issues anywhere within the enterprise (this includes SOA applications and networks residing in virtual, cloud, web and mobile infrastructures). Hops can consist of any and all multi-vendor technologies, core banking applications, network communications links, third party services, EFT/bank authorization connections, mobile platforms and web-based infrastructures found in a multi-channel banking environment.



INETCO Insight has been specifically configured to pass real-time transaction alerting information directly into the APTRA Vision environments. Exceeding transaction alerts, transaction event and counts incident created and APTRA Vision monitoring thresholds generates an alert in INETCO Insight. The alert is picked up APTRA Vision managed based on user-defined rules web-based User Interface in APTRA Vision and incidents created based on user defined rules when required.

Relate incidents back to revenue and the customer experience

The ability to track and set customized alerts based on every individual transaction, even those travelling through third party and virtual environments, means APTRA Vision can speed up the identification of transaction failures, response time slowdowns and anomalies, such as unexpected response codes, host connection time outs, supplier offline scenarios or TCP disconnects. Examples of real-time event outputs that can be forwarded to APTRA Vision include:

1. Transaction response time alerts (issues by external authorization points and application response time delays causing long completion times)
 - Bank authorization or 3rd party service response times are slow
 - ATM connection, switch or application service response times are slow
 - Network response time delays
2. Transaction anomaly alerts (based on application payload information such as response codes, dollar amounts)
 - Transaction volumes are close to exceeding thresholds
 - Higher dollar amounts per transaction (ATM needs replenishment)
 - Overall transaction declines, reversals, or failures are higher than normal

3. Transaction failure alerts (based on rates of approved, declined, reversed, failed and unsupported transactions)

- Transactions from a certain card type, ATM terminal ID, EFT network, switch routing, service type, geographic location or channel are not completing at expected levels, or are identified as "unsupported"
- External authorization points such as inter-bank or EFT connections, telecom partners or other third party service providers are slow or not responding
- TCP disconnects, MAC errors and other response error codes (can be customized)

Combined with NCR APTRA Vision, INETCO Insight can bring a whole new level of consumer experience analysis and proactive awareness to organizations by monitoring exactly how well transactions perform for the consumer and not just whether they have been completed and the self-service device is working. This combined solution will lead to improved service reliability, increased operational efficiency and better leverage of your IT investments.

APTRA OptiCash and INETCO Insight

INETCO Insight captures and decodes individual transactions in real time, and when fed into APTRA OptiCash or APTRA Vision, increases the granularity of real-time performance alerts and statistical reporting data. Whereas the combination of APTRA Vision and APTRA OptiCash is strongest in planning day to day cash forecasts that need lead time to support carrier route planning and replenishment scheduling, the intraday withdrawal and deposit information INETCO Insight can provide is of most use for withdrawal exception management, emergency replenishment response management (for example, identifying when an ATM balance is rapidly and unexpectedly being hit), and in new cash point scenarios where more frequent updates are needed to improve the accuracy of forecasts.

Improve intraday cash position monitoring

Traditionally, banks would get updates of total withdrawal and deposit activities by overnight file transfer from the ATM switching and settlement system. But information about an ATM, its location, access hours, and service replenishment company is changing too rapidly for this to be enough. While the advanced algorithms can predict future requirements with a high degree of precision, the reliability of source data such as actual past withdrawal and deposit totals, is important to consider as well.

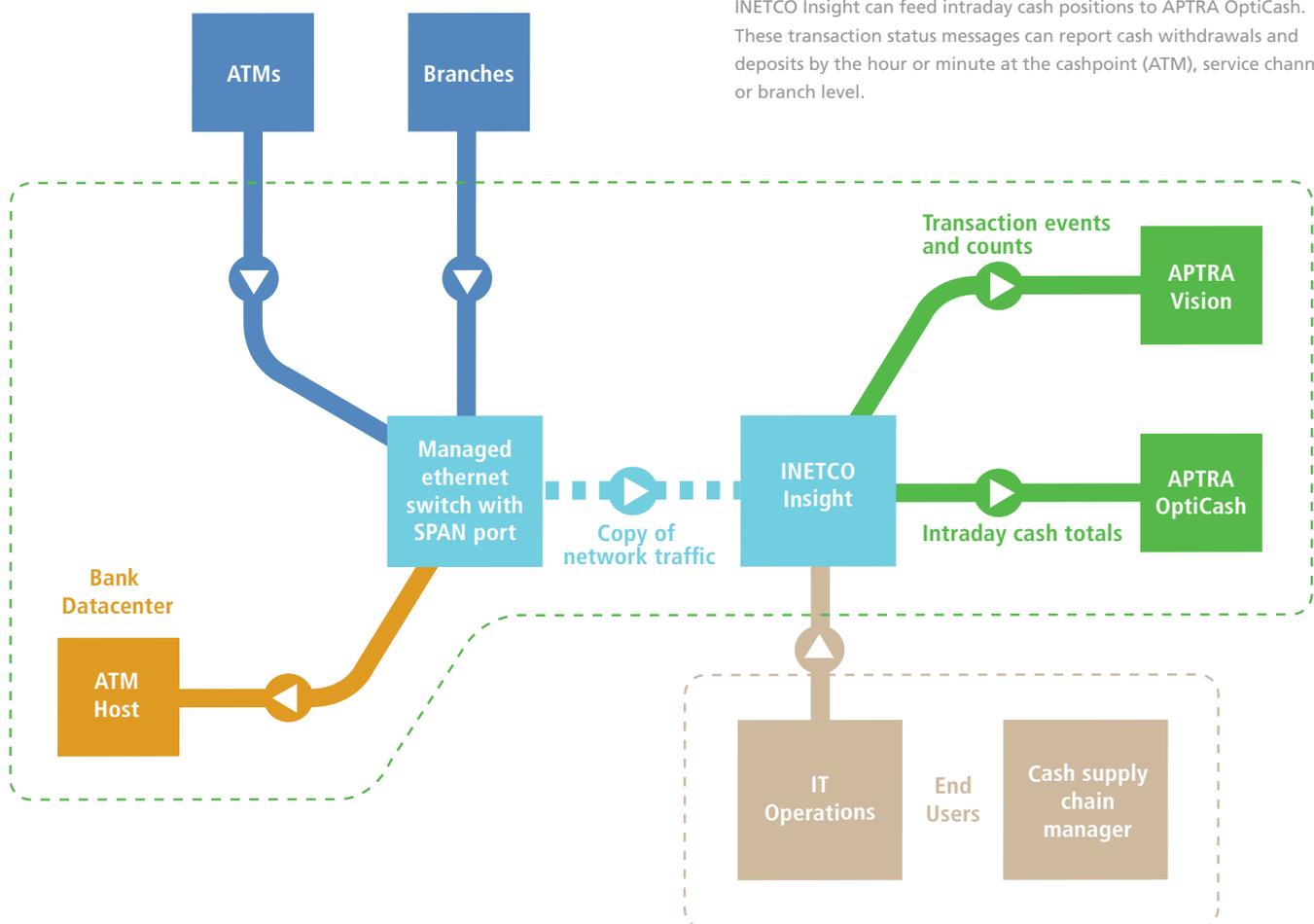
INETCO Insight's transaction status messages, fed into APTRA Opticash, will give organizations the option to receive cash positions in real-time or near real-time. This makes it easier to monitor cash withdrawals and deposits by the hour (or in some cases by the minute), and respond quicker to situations where actual cash demand has varied significantly from the original forecast.



Aggregate hourly cash positions at the individual cashpoint, service channel or bank branch level

The combination of APTRA OptiCash and INETCO Insight helps banks look deeper than 24 hour cash positions and become aware of time of day variations to optimize all their cash points and avoid costly emergency replenishments. INETCO Insight provides intraday transaction data such as cash balances, hourly withdrawals, hourly deposits, check and cash transfer information. Transaction analytics can be aggregated at any individual cash point (ATM, recycling devices, vaults, etc.), service channel or bank branch level. Information such as hourly bank branch cash positions can be fed into APTRA OptiCash and accessed by users online to reduce risk, improve the accuracy of cash deliveries and expand cash replenishment capabilities beyond the ATM, without having to deploy agent technology or touch the host switch.

A combination of APTRA OptiCash and INETCO Insight also moves us closer to the idea of a secure cash cloud, where a bank can have a central repository for information about cash positions at every cash point, including the branch, vault, ATM, teller, etc. INETCO Insight would enable them to see all transactions in this cloud, giving managers a “disposition” of money. With a holistic view of these events, managers would be able to build forecasting models for the bank and determine a real-time cash position at a higher level.



INETCO Insight can feed intraday cash positions to APTRA OptiCash. These transaction status messages can report cash withdrawals and deposits by the hour or minute at the cashpoint (ATM), service channel or branch level.

Summary: A holistic vision is more powerful than the sum of its parts

Self-service channel performance management is about managing the unforeseen, the changes and the exceptions—in the most efficient and cost effective way possible. Once achieved, financial institutions will have the power to raise the bar in terms of customer experience, operational efficiencies and IT investment leverage. Attaining this in ATM and multi-channel banking environments starts with end-to-end visibility:

- Across all customer-focused technology
- Across all transactions, service applications and network infrastructures
- Across all cashpoints, channels and branches

The combination of NCR APTRA Vision, INETCO Insight and NCR APTRA Opticash represents an integrated solution that is far more holistic than any other self-service network management offering on the market today. This portfolio of self-service device management, end-to-end transaction monitoring, and cash forecasting gives operations teams the agility, oversight and control needed to drive continuous service improvement, identify priority service risks and manage an increasingly complex multi-channel banking environment—all in an efficient, cost effective way.

While each of these solutions can provide powerful benefits, the real wins are scored when they are used together.

Solution name	APTRA Vision	INETCO Insight	APTRA OptiCash
Use cases	<p>Self-service device management with Key Performance Indicators (KPI):</p> <ul style="list-style-type: none"> • Device Availability • Incident management • Transaction status • Unserved Customers • Cash Monitoring • Fleet inventory management for hardware and software <p>Real-time device status enables customers to manage their self-service device fleet with optimal operational efficiency, while gaining business intelligence for future growth.</p>	<p>End-to-end transaction monitoring.</p> <p>Run as a stand-alone solution or a real-time transaction feed that can decode and forward status messages into APTRA Vision and APTRA OptiCash.</p> <p>Profiles end-to-end lifecycle of every consumer transaction, across all service channels.</p> <p>Provides intraday cash positions (real-time or near real-time) at the ATM, service channel and bank branch level.</p>	<p>ATM, Branch and Retail Cash replenishment strategy planning and execution</p> <p>Business scenario planning, vendor selection and evaluation</p> <p>Complimentary solutions are also available to address:</p> <ul style="list-style-type: none"> • Vault optimization • Carrier services integration • Invoice reconciliation with key stakeholders
Benefits	<p>Continuously improve your self-service device performance and availability through KPI tracking and analysis.</p> <p>Ensure consumer loyalty with amazing experiences each and every time.</p> <p>Decrease costs and inefficiencies with our robust, central platform and single user interface.</p>	<p>Isolate issues affecting transaction completion—65–75% faster, without deploying agents or impacting the switch.</p> <p>Monitor all withdrawal, deposit, reversed, failed, unsupported and service transactions for every channel.</p> <p>Profile customer experience, application and network metrics for every transaction.</p>	<p>Automate replenishment strategy optimization at the cashpoint level in real time.</p> <p>Reduce downtime, cash holdings and logistics costs.</p> <p>Increase availability and network resiliency.</p> <p>Provide business simulation tools to inform planning and option selection processes.</p>

Why NCR?

NCR Corporation (NYSE: NCR) is the global leader in consumer transaction technologies, turning everyday interactions with businesses into exceptional experiences. With its software, hardware, and portfolio of services, NCR enables more than 550 million transactions daily across retail, financial, travel, hospitality, telecom and technology, and small business. NCR solutions run the everyday transactions that make your life easier.

NCR is headquartered in Duluth, Georgia with over 30,000 employees and does business in 180 countries. NCR is a trademark of NCR Corporation in the United States and other countries. The company encourages investors to visit its web site which is updated regularly with financial and other important information about NCR.

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