



# DATA CONSISTENCY MONITORING

a prerequisite of observability

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# Contents

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**01**

Introduction: data-centered digital transformation for better digital experiences

**02**

Data consistency monitoring: the basis of end-to-end observability

**02**

Consistency: conformity, coherence, compliance...

**03**

How data consistency is monitored

**04**

Results for analysis and action: keeping track of data consistency

**06**

Typical customer use cases

**11**

The outlook for data consistency monitoring

## Introduction

### Data-centered digital transformation for better digital experiences

How can we get value from data? This is a major preoccupation of decision-makers and teams in charge of delivering personalized digital services adapted to each user's needs.

But there is another concern that is just as strategic: how to ensure the integrity and consistency of the data that is displayed when someone uses a service provided by any type of application - web apps, business software, etc.

Sometimes consistency checks are apparent to users. When people enter a wrong password or a date in the wrong format, they are instantly warned that they need to change something. In such events, users are aware that the digital service is checking inputs for consistency.

More frequently, however, such checks operate behind the scenes. A web, business, or mobile application integrates data, processes it, calculates a result, and returns it. These operations are generated by the application itself with its algorithms, databases, APIs, third-party content, and so forth.

Managing the customer experience means ensuring that the application is returning reliable data and documents. Furthermore, is this information being delivered completely, accurately, and securely?

**Data consistency monitoring is at the heart of a high-quality user experience.**



**Data consistency monitoring: the basis of end-to-end observability**

Measuring the quality of the user experience is key in increasingly complex and hybrid IT environments. Users need and expect increasingly sophisticated business services through a variety of digital channels.[1] The purpose of monitoring their experience is to ensure that your applications and websites are running smoothly to provide a satisfying experience.

To do so, it is vital to measure and track the availability and response times of digital services. These metrics indicate whether applications are up and how well they are performing. Yet, while these metrics are necessary, they aren't enough. They don't answer this important question:

**Are users getting information and responses that are correct and reliable at every step of their journey?**

To make sure that the customer experience is satisfactory, you need to monitor quality and the reality of the information at each step of the user journey. In other words, you need to monitor every step to ensure the reliability of your data and documents and know whether they are provided to users securely.

To sum up, you need metrics to be able to answer to all three of these questions:



*Can the user interact with the application (availability)?*

*Is the application running efficiently (response times and performance)?*

*Are responses accurate and secure (data consistency and integrity)?*

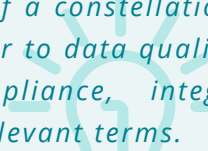
**Consistency: conformity, coherence, compliance...**

To be clear about how specialists in the field of digital experience monitoring (services observability) understand data consistency, let's consider the four Cs: consistency, conformity, coherence, and compliance. (These terms may have very specific meanings in other IT fields, such as database administration, for example.)

In relation to the principle of observability, "consistency" can be a broad denomination. This is because the inputs in end-user contexts are very diverse, as are the types of output they request.

[1]Adapted from Enterprise Management Associates, Inc. "Best Practices for Successful Digital Experience Management".

*The expression “data consistency”, in the domain of digital experience, is part of a constellation of related terms. People may refer to data quality or conformity, coherence, compliance, integrity, accuracy, or similar context-relevant terms.*



For example, to pass a data consistency test in an observability context, inputs must be compliant with current security and privacy regulations (the GDPR, for instance).

They should conform to generally accepted standards (SSL certificate, for example, or SSO) or specific internal policies (such as invoicing), business-related procedures, and other rules. Information is coherent when it makes sense; it is accurate and complete between dimensions.

Data consistency, in the context of digital experience, encompasses all of these aspects. It means that data is accurate, complete, and secure in all dimensions from sign-in to logout, from connection to checkout.

These concerns are addressed together within the wider discipline of data governance.[2] Thus, user-centric consistency checks, because of their focus on the user side, may be understood as a downstream component of the larger data governance picture.

Concretely, in terms of observability, data consistency is monitored on the basis of transactions between the user and the application, on desktop and mobile devices. The tool used to check data consistency should be able to monitor every kind of application: web, thick-client, Citrix-delivered, mobile, and any other.

This type of data consistency monitoring surveys everything in the application delivery chain, including databases, APIs, and external platforms or third-party content. Good data consistency monitoring should be infrastructure agnostic, to cover every kind of application running on the intranet, internet, or cloud

### **How data consistency is monitored**

Data consistency checks can be automated so that you don't need to dedicate staff to running tests. Instead, robots can run user journeys (also called transactions) that are representative of actions performed by human users of any kind of application.

These journeys – built to specification for each customer – commonly contain the steps of logging on and passing security challenges, opening an application, agreeing to terms and conditions of use or validating GDPR notices, calling up a customer record, documents or files, adding an item to a shopping cart, selecting from a drop-down list, or any other actions that employees or customers typically perform to complete their mission-critical tasks.

Running at regular intervals, at any time of the day or night, robots check the consistency of the data in the user journeys.

- *Consistent data means the response (output) corresponds to the request (input). For example, when a user clicks a link to download a specific file, the user must receive the expected file. The file must be the right one and open correctly to pass the consistency test.*
- Inconsistent data means the response (output) does not correspond to the request (input). For example, when a user clicks to buy an item on sale for a certain price, that price should appear at checkout. If the price displayed at checkout is different, it fails the consistency test.

*This type of supervision is mainly carried out using synthetic supervision solutions.*

User journeys are created and tailored to each customer's specific needs to test the customer's applications or websites.

Depending on the solution, customizable criteria may be provided. These may be activated at each step of a journey to detect information, evaluate its consistency, and validate it.

Here are some of the elements that may be used to build detailed journeys and check the consistency of data inputs and outputs:

- **detection of DOM elements**
- **upper and lower limits**
- **date ranges**
- **mathematical and Boolean operators**
- **image recognition and comparison**
- **OCR text searches**
- **custom-defined shared data**
- **keystroke combinations**
- **keyboard/user/mouse actions (enter, click, scroll, swipe)**
- **network traffic analysis**
- **control of tags and cookies**

### **Results for analysis and action: keeping track of data consistency**

The results of data consistency monitoring can be viewed in real time for immediate action, especially if the solution offers an alerting system. An alert might be issued, for example, when the amount at checkout does not correspond to the price listed in a special offer.

Results may also be charted graphically in dashboards in real-time or over a length of time to identify trends. For instance, an energy provider can view a chart of fluctuations in the price of a kilowatt hour, correlating in real-time with its own pricing for customers to check consistency.

If reporting is part of the offer, it is an invaluable instrument for communication. With everyone referring to the same report, technology teams and business lines have what they need to identify any problems that occur. They can then more easily clarify responsibilities for fixing the issues at hand.

The information returned naturally depends on the capabilities of the observability solution:

The solution not only checks that each step is completed correctly, but also measures the time each step takes.









If the solution has an image capture feature, it correlates timings with a screenshot of the application at that step.

If the solution has artificial intelligence capabilities, it may also suggest ways to improve or optimize the process.

If the solution can analyze network traffic, it would check whether your tags are loaded correctly and whether any unexpected tags are present.

If alerting is enabled, the solution issues alerts when the data is inconsistent or erroneous.

**The resources you can activate to check the consistency of the data in your business processes.**

<p><b>Text search</b></p>  <p>Find a text</p>	<p><b>Capture</b></p>  <p>Take a screenshot of a limited area of the screen, so you can click on it or simply search for it on the page</p>	<p><b>OCR</b></p>  <p>Select a limited area of the screen where you want to search for a specific text</p>	<p><b>File</b></p>  <p>Import a file that you want to use in your user journey.</p>
<p><b>Certificate</b></p>  <p>Import a certificate file that you want to use in your user journey.</p>	<p><b>API</b></p>  <p>Create a monitor</p>	<p><b>DOM</b></p>  <p>DOM element detection</p>	<p><b>Tags and cookies</b></p>  <p>Check that tags are loaded correctly</p>

A variety of technologies and search criteria are available in the Ekara platform's journey-creation Studio to:

test the reliability of user journeys.

validate expected content (including third-party)

detect the presence of all expected elements (DOM elements, forms, images, tags...)

check regulatory compliance (security, privacy, cookies...)

# Typical customer use cases

Observability specialists have compiled and refined typical use cases on the basis of data consistency monitoring campaigns for customers in a variety of business sectors in recent years.

These are schematized generically in the diagrams that follow

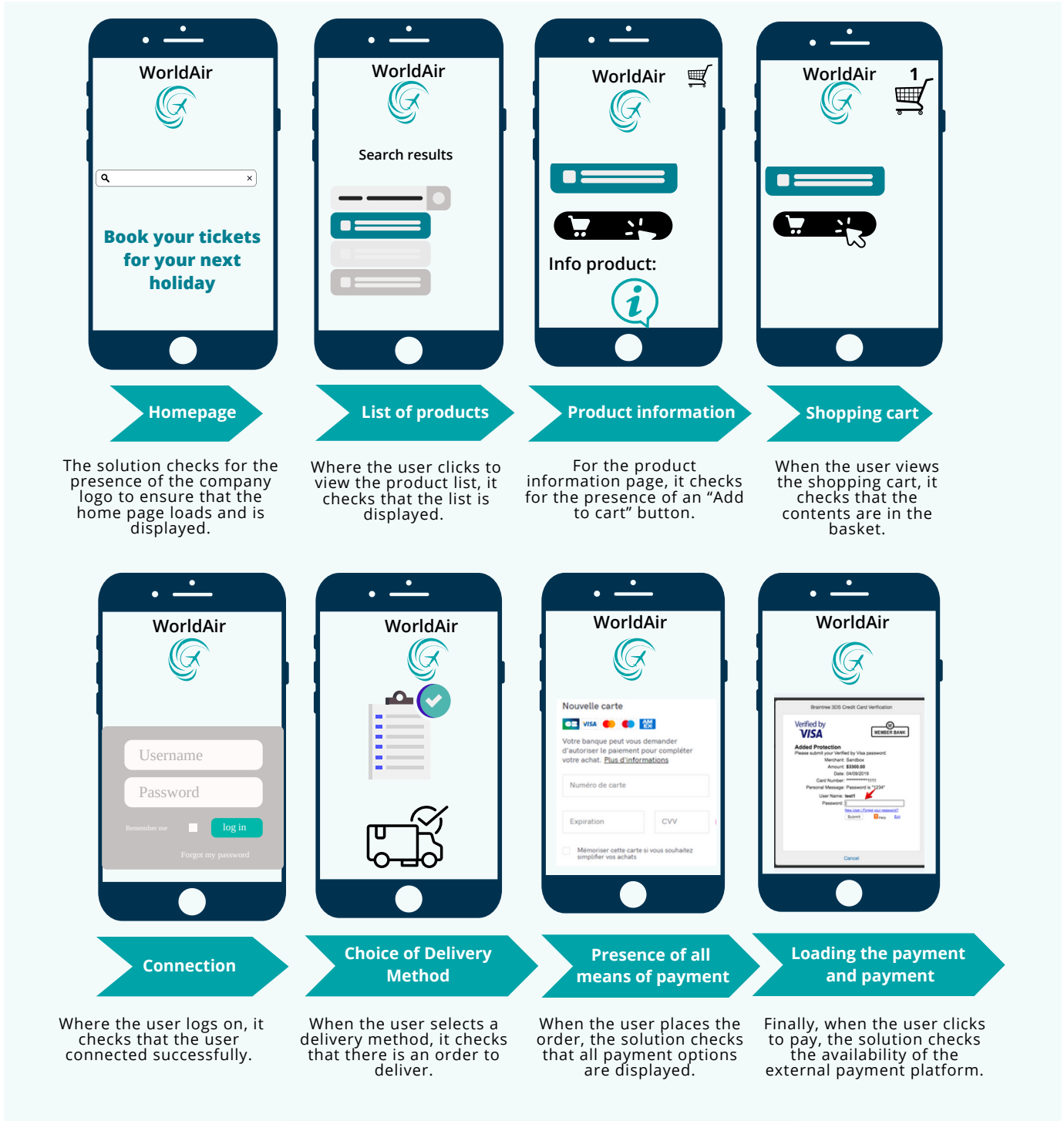
**Four use cases will be detailed: \*\***

1. **An end-to-end consistency check of an online order or booking funnel.**
2. **An end-to-end consistency check of online quote generators**
3. **An end-to-end consistency check of ERP, CRM, or business-specific software**
4. **An end-to-end consistency check of strong authentication 3D Secure transactions**



# End-to-end consistency check of online order or reservation funnels

This diagram shows the sequence of stages in a user journey, from visiting the home page to payment of the order. The 8 stages and their corresponding consistency checks are:



"The solution is now at the heart of our management of operations and customer relationships. We are working on extending rollout to our entire range of strategic applications, implementing cross-functional reporting, and ensuring 24/7 continuity of monitoring." - an airline company"

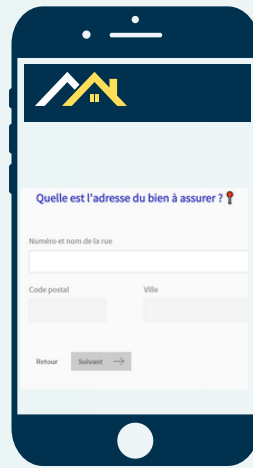
# End-to-end consistency check of online quote generators

This diagram traces the steps performed in a user journey, from visiting the homepage to downloading a quote for an insurance policy or a car. The 7 steps and corresponding consistency checks are as follows:



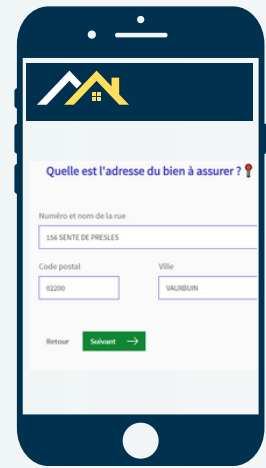
Homepage

The solution checks for the presence of the company logo to ensure that the home page loads and is displayed.



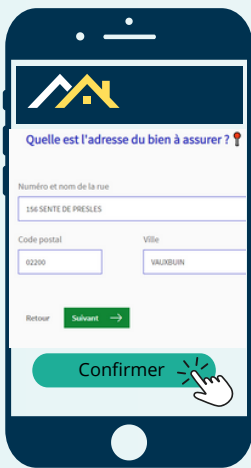
Cookies consent

It checks that the consent management platform is present and allows the user to make cookie choices (GDPR). The solution surveys the tags during the journey to detect any configuration or security problems (piggybacking).



Quote page

Where the user visits the quote page, it checks that the fields for filling in a form are displayed.



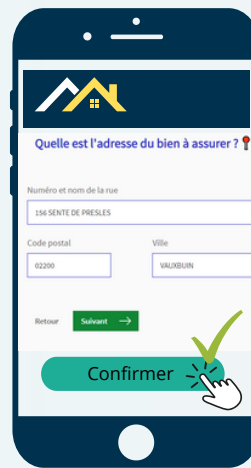
Fill in form

Where the user goes to fill in the form, it checks that the form is operational and that it is visible for the user.



View quote

When the user clicks to obtain a quote, it checks that the information appears correctly.



Acceptance of the quote

At the stage where the user validates the quote, it checks for the presence of the "Confirm" button.



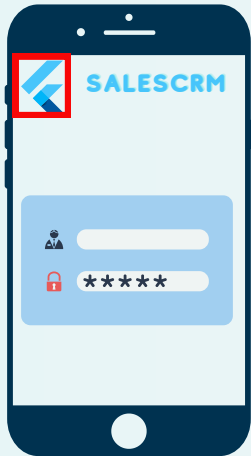
Download quote

At the end, when the user downloads the PDF of the quotation, the solution checks that it is the correct file.

*"The solution enables us to improve user experience...its ability to detect the origin of incidents is especially appreciated." - an insurance company*

# End-to-end consistency check of ERP, CRM or business-specific software

This diagram traces the steps performed in a user journey, from signing on to a business application to logging off securely. The 6 steps and their corresponding consistency checks are:



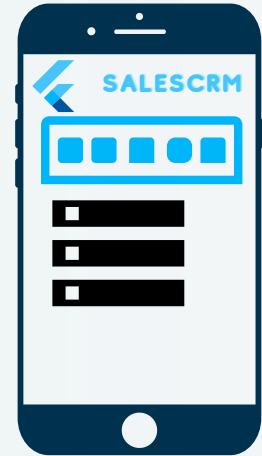
Homepage

The solution checks for the presence of the company's logo and the username field to make sure the homepage loads and displays correctly.



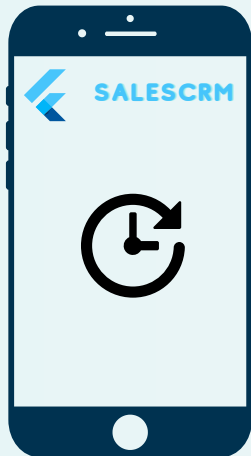
Authentication

The solution then makes sure the authentication process is completed correctly and that the user is signed on.



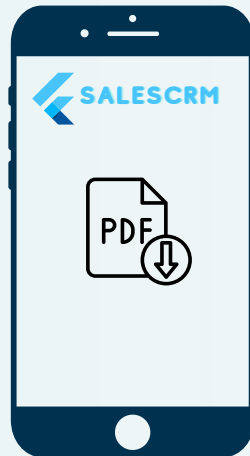
Menus test

It checks that the menus that were requested display properly.



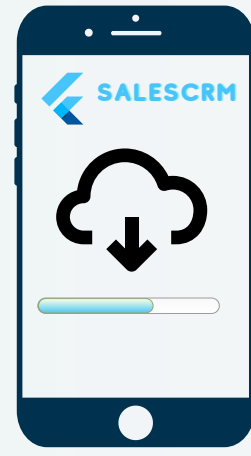
Features test

When the user tests a feature, it waits for and validates the response.



Import file

When the user imports a file, it checks that it was imported completely.



Download

When the user downloads a file, it opens the file make sure it is the right one and check its electronic signature.

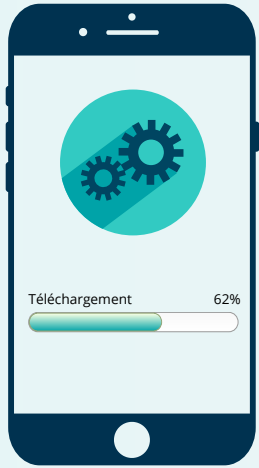
*"Our synthetic monitoring solution identified a problem in our ERP document archive and supplied in-depth metrics for each step." - a company in the energy sector*

*"We rely on a trusted provider for objective metrics about the quality of service we deliver to end users. This way, our customers can be assured that our infrastructure is reliable, particularly with respect to database configuration and security." - a construction advisory firm.*

# End-to-end consistency check of strong authentication 3D secure transactions

This diagram traces the steps performed in a user journey, from installing an authentication application to the validation of a transfer in a secure payment process.

The 5 steps and corresponding consistency checks are as follows:



The solution monitors the downloading and installation of a bank's authentication application.



It tests whether the activation code for strong authentication is received by the user.



It checks input of customer information and the format of the amount of the transfer.



When the user confirms payment, it checks that the authentication mechanisms intervene correctly.



Lastly, the solution checks that the transfer is validated by the bank and that the amount corresponds to the amount entered by the user.

**Availability**

**Security**

**Compliance - Reliability**

**Performance**

# The outlook for data consistency monitoring

The concept of “data consistency” has long been a focus of attention among professionals in certain areas of IT. Specialists of digital experience monitoring, on the other hand, have only more recently tapped into the potential of their tools to approach data consistency from the “outside-in” end-user perspective.

"When Gartner predicted that by 2025, 70% of digital business initiatives would require I&O leaders to report UX-related business metrics[3], it was not entirely clear how user-side business metrics could engage with issues that infrastructure and operations professionals face.

Data consistency checks are one significant response to that question. Inconsistencies recorded from the user side translate defects to remediate in the application delivery chain. Because data inconsistencies affect the business, a failed consistency check is a first diagnostic designating areas for priority treatment.

**The value of observability solutions from now on will be increasingly tied to end-user data consistency checks.**

Looking ahead, we should see a rise in the demand for solutions which offer features aligned with ensuring data consistency. It also means observability customers will demand monitoring and reports with capabilities that further address the critical need for data consistency testing.

# Thank you!



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