



Zero Trust Evaluation Guide

For the Workforce



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Today, the rise in a cloud-connected, mobile and remote workforce has put the visibility and control of users and devices outside of the enterprise.

Zero Trust?





ORIGINAL PERIMETER

- ENDPOINTS
- ON-SITE USERS
- SERVERS
- APPLICATIONS
- DATA CENTERS



PERSONAL & MOBILE DEVICES

NEW IDENTITY PERIMETER



REMOTE EMPLOYEES



CLOUD
INFRASTRUCTURE
& APPLICATIONS

The perimeter has expanded beyond enterprise walls, making it more difficult for security and IT teams to verify user identities, and the trustworthiness of their devices, before granting both access to enterprise applications and data.

The new workforce model today requires an equally extended security model.

The extended perimeter is now centered around user identity and their devices.

The extended workforce security model must be able to establish device and user trust, no matter where the user is physically, and no matter what kind of network they're connecting from.

Zero trust treats every access attempt as if it originates from an untrusted network.

A trust-centric model is focused on authenticating every user and device before granting access to any application.

A zero-trust approach doesn't require a complete reinvention of your infrastructure.

The most successful solutions should layer on top of and support a hybrid environment without entirely replacing existing investments.

NEW IDENTITY PERIMETER RISK

Compromised credentials are a prime target of attackers, allowing for easy, unprotected access due to phishing, brute force and other password attacks. In an analysis of simulated phishing campaigns, *Duo's 2018 Trusted Access Report* found that more than half (63 percent) successfully captured user credentials.



User Trust

The Different Zero-Trust Models

The concept of zero trust can be seen in **Gartner's CARTA** model — continuous adaptive risk and trust assessment. This calls for a shift away from one-time, binary access decisions and toward contextual, risk and trust-based decisions. This model is about giving just enough trust to users, even after authentication, to complete the action requested.

Forrester's Zero Trust eXtended (ZTX)

refers to breaking down "monolithic perimeters" into a series of micro-perimeters or network segments to apply granular security controls around them. But they also acknowledge that it's much more than just network segmentation – it's a holistic approach to securing data, network, device, workloads and workforces.

Google's BeyondCorp is their implementation of a zero-trust architecture that requires securely identifying the user and device, removing trust from the network, externalizing apps and workflow, and implementing inventory-based access control.

All of these models require more controls around identity as the new perimeter – users and their devices as they access applications and services. There are many different components of a zero-trust model that require securing different workflows:

Workforce

Ensure only the right users and secure devices can access applications.

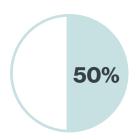
Workload

Secure all connections within your apps, across multi-cloud.

Workplace

Secure all user and device connections across your network, including IoT.

One approach is to start by ensuring only the right users and secure user devices are accessing applications; your workforce – the foundation of a zero-trust model. This guide is focused on evaluating the criteria required to adopt a trust-centric security approach for the workforce.



Gartner predicts security as a service will represent at least 50 percent of security software delivery by 2020.



The scope of this guide will focus on zero trust as it relates to securing your **workforce** – that is, users and the devices they use to access work applications. Users may include employees, partners, vendors, contractors and many others, making it more difficult to maintain control over their devices and access.

A zero-trust approach for the workforce should provide an organization the tools to be able to evaluate and make access decisions based on specific risk-based context.

For example:

- + Is the user who they say they are?
- + Do they have access to the right applications?
- + Is their device secure?
- + Is their device trusted?

Security teams need to be able to answer these questions to establish trust in users and devices accessing an organization's assets. They also need to do it using an approach that balances security with usability.

This trust-centric security approach for the extended perimeter makes it much more difficult for attackers or unauthorized users to gain access to applications without meeting certain identity, device and application-based criteria.

Zero Trust: For the Workforce

Consider the following steps to take on your zero-trust journey toward securing your workforce:

Establish User Trust

User Trust

Can you verify your users are who they say they are? Are you using a scalable, frictionless MFA solution?

Using MFA and establishing user trust is the first step toward building a zero-trust model and protecting against compromised credentials, phishing and other password-based attacks.

Gain Visibility Into User Devices

Do you have detailed insight into every type of device accessing your applications, across every platform?

Transparency into every endpoint allows you to see which may be introducing risk to your environment – out-of-date software can contain security flaws that can be exploited by attackers.

Establish Device Trust

Can you check the security posture and trust of all user devices accessing your applications?

Can you securely support all devices and BYOD (bring your own device) – both corporate and personally-owned devices?

At the time of login, check the trustworthiness of user devices to determine their security posture, no matter who manages or has control over the device.

Enforce Adaptive Policies

Can you enforce granular, contextual policies based on user, device and location to protect access to specific applications?

By enforcing contextual access policies that evaluate risk based on attributes like location, user role, device type, etc., you can have more dynamic control over who and what can access certain applications – allowing only the minimum amount of access required for a user to do their job.

Enable Secure Access to All Apps

Can you give your users a secure and consistent login experience to both on-premises and cloud applications? Implement MFA and device insight to enable secure access to all different types of applications, services and platforms. The combination of both a trusted user and a trusted device makes it more difficult for an unauthorized user to pose as a legitimate one logging into your applications.

This guide will dive into each step, and help you shape your criteria and requirements for the technology and solutions to provide secure trusted access from your users and their devices to work applications.

Multi-Factor Authentication

Verify your users' identities with a scalable, frictionless multi-factor authentication (MFA) solution.

Support Every User

Does your MFA solution provide flexible authentication options to fit a broad range of users, security profiles and technical backgrounds? Make sure your solution supports employees, frequent travelers, contractors, vendors, customers, partners, etc.

You should be able to customize and enforce which MFA methods can be used. For more secure access to high-risk applications, require the use of:



Easy-to-use, out-of-band mobile push notifications



Phishing-proof <u>Universal 2nd Factor (U2F)</u> security keys



Biometric-based WebAuthn

Ease of Administration

Is your MFA solution easy for administrators to deploy? Choose a cloud-based solution that requires minimal infrastructure and staff to roll out to reduce the burden on your team.

Does it provide user enrollment and provisioning options to scale as your organization grows? For example:



Auto-enrollment



Administrative APIs for scalable user provisioning



Option to synchronize users from existing directories, such as Active Directory and Azure AD

Save on training, support and ongoing help desk tickets with user self-enrollment and self-service – let your users enroll in MFA and manage their own authentication devices without administrative assistance.

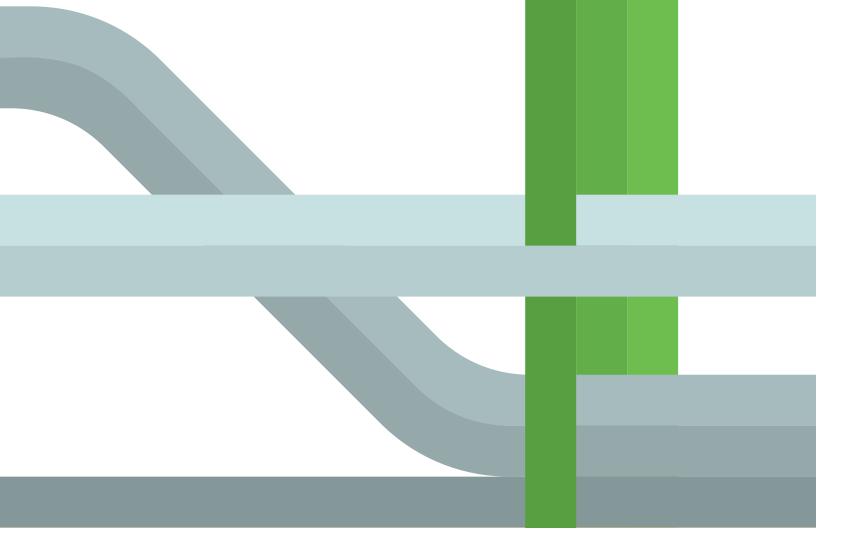
Reduce risk with a flexible, easy-to-use and easy to deploy multi-factor authentication solution.

01

Establish User Trust

The first step toward architecting zero trust for your workforce is verifying your users' identities when they log into your cloud and on-premises work applications, services and platforms.

Can you trust your users are who they say they are? And how do you reduce the threat of compromised credentials and devices caused by phishing, malware and other vectors – while also meeting data regulatory compliance requirements for access security?



Gain Visibility Into Devices

Next, evaluate if your solution can give you insight into the devices connecting to your applications and data that you can leverage to control access based on device security health.

Do you have visibility across every type of end user device - mobile, desktop and laptop? Is there one tool that centralizes authentication and endpoint data across different device platforms? Can you easily get an overview of your users, endpoints and authentication activity?

Device Visibility

Get detailed insight into the security health of every type of device (whether corporate-managed or personally-owned) accessing your applications.

Across Every Platform

Some device visibility solutions only give you limited insight into certain platforms and operating systems, like only those running Windows or desktops. Reduce the need to access different data systems with one centralized dashboard that gives admins oversight across:









Whether corporate or personally-owned







OPERATING SYSTEMS

Windows, Mac, iOS, Android, etc. (versions, number of out-of-date devices)









BROWSERS

Chrome, Firefox, Edge, Internet Explorer, etc. (versions, number of out-of-date devices)



PLUGINS

Java and Flash (versions, number of out-of-date devices, enabled, disabled or uninstalled)

"Zero trust demands that security teams retain visibility and control across their entire digital business ecosystem, regardless of location, device, user population or hosting model."

—Forrester Zero Trust eXtended (ZTX)

User Trust

Device Visibility

Device Trust Ad

Adaptive Policies Acc

Access to All Apps

Duo's Zero Trust



The extended perimeter presents new challenges around securing BYOD (bring your own device). A zero-trust model should both work well with your existing infrastructure without causing friction, and support any type of device.

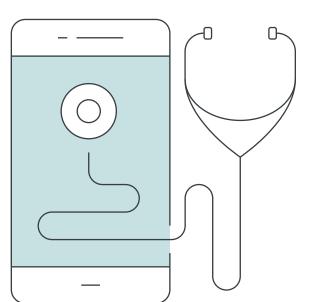
You should be able to get insight into personal and corporate-owned devices, including mobile devices. BYO devices may not meet security requirements or may be running older software versions prone to vulnerabilities.

A comprehensive device visibility solution should let you identify mobile devices with certain security features enabled or disabled, as well as their security posture:

Device Logs & Reports

Many compliance regulations and auditors require user activity and device security logs and reports. Can your device visibility solution give you access to detailed reports on user behavior and risky devices – all in one dashboard? Does it integrate nicely with any existing SIEM (security information and event management) software?

Make sure your admins have easily accessible and exportable reports for auditors, with insight into authentications, users, admins, policies and more.





OPERATING SYSTEM

iOS or Android version



DISK ENCRYPTION



SCREEN LOCK



BIOMETRICS

Fingerprint, Touch or Face ID



DEVICE STATUS

Jailbroken, rooted or tampered with



03.

Establish Device Trust

At login, check the security health of all user devices attempting to access your applications. Establishing trust extends beyond managing the status of the device to include inspecting and controlling access based on mobile and personally-owned devices.

Can you enforce endpoint controls for risky devices or corporate-owned devices? How are you establishing mobile device trust? Are you able to automatically notify users of out-of-date software to reduce your help desk tickets?

Enforce Endpoint Controls

By leveraging the visibility of devices connecting to your applications (as discussed previously), you should be able to establish device-based access policies to prevent any risky or untrusted devices from accessing your applications.

Risk-Based Device Access

For access to high-risk applications, you may require a device to be corporate-owned or managed by your organization's IT team. High-risk applications may include electronic health record (EHR) systems like Epic that contain patient health information; cloud infrastructure like Microsoft Azure and Google Cloud Platform; and many others

Can you enforce access policies based on the application risk or whether the device is corporate or personally-owned? And can you do this without requiring endpoint certificates?

Additionally, you may require MFA for access to more sensitive applications for a higher level of assurance of your users' identities. Can you require your users to use push notifications, U2F security keys, or biometric-based WebAuthn before granting them access to certain applications?

Establish Mobile Device Trust

Make sure your solution allows you to establish mobile device trust with or without the use of mobile device management (MDM) software.

Users may object to installing MDMs on their personal devices due to privacy concerns, resulting in lower overall adoption and reduced insight into their device security. And sometimes it's outside of your IT team's control to install an agent on the personal devices of third-party providers that may need access to your applications.

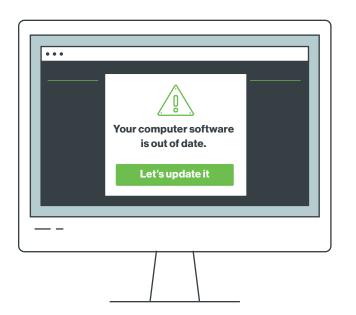
Whether or not you have an MDM solution, you should be able to block devices from accessing your applications based on:

- + OS, browser and plugin versions and how long they've been out of date
- + Status of enabled security features (configured or disabled)
- + Full disk encryption
- + Mobile device biometrics (Face ID/Touch ID)
- + Screen lock
- + Tampered (jailbroken, rooted or failed Google's SafetyNet)

Notify Users to Update Risky Devices

Does your solution enable your users to manage their own devices? Choose a solution that can detect older software versions, then notify users when their device software is out of date.

To relieve the burden on your help desk support team, prompt users to update the software on their own devices at login. A self-service portal also allows them to easily manage their own authentication devices without submitting a help desk ticket.



Enforce controls and policies to keep risky endpoints from accessing your applications.



Enforce Adaptive Policies

Enforce contextual access policies allowing access to your applications with user, device and location-based controls. The context includes different aspects of their login attempt - where they're located, what role they have in your organization, what type of device they're using, etc. Limit access to only what your users need to do their jobs and add stricter controls for access to more sensitive applications - without negatively impacting user workflows. Can you customize policies based on users, user groups or user location? Or challenge users with a more secure MFA method, based on what application they're accessing?

Contextual **Access Policies**

Customize policies to allow, deny or require stricter security based on user-specific roles and responsibilities, devices and applications – all while balancing security with usability.

Role-Based **Access Policies**

Introduction

User Trust

Not all users need access to every application - can you customize access based on the type of user group? Give contractors or third-party providers temporary and restricted access to non-sensitive applications or systems.

You should be able to enforce policies to grant a higher level of access to admins and privileged users, while ensuring only developers have access to your production environments and cloud infrastructure.

Check that your admins can:

- + Customize policies based on the user, group, or their specific roles and responsibilities
- + Set custom policies based on authentication method
- + Only allow users to authenticate using certain methods
- + Easily use Active Directory or Azure AD user groups to apply policy

App-Specific Policies

Enforce the use of more secure MFA methods for access to business-critical applications and services to reduce the risk of unauthorized access.

Your admins should be able to configure app-specific policies to require only the use of push-based or U2F security keys to verify your users' identities before granting access to these applications. The required use of only more secure methods provides a higher level of assurance of user identity; strengthening access control to your more sensitive applications and data.

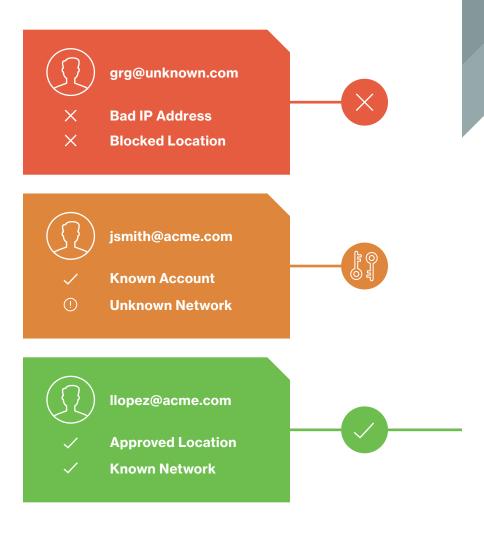
Introduction User Trust Device Visibility Device Trust Adaptive Policies Access to All Apps Duo's Zero Trust

User Location

Prevent unauthorized access from any geographic location with user-based access policies. If you don't do business in certain countries, you should be able to block access attempts originating from those regions.

Admins should also be able to block authentication attempts based on a set of IP address ranges or those coming from anonymous networks like Tor or proxies.

However, non-blocked IP addresses do not imply that access is allowed – this is only one attribute to consider in the broader context of an access request.



"Shift from 'good' versus 'bad' macro decisions, toward a context-based set of smaller decisions. Give just enough trust to entities like users – even once they've been authenticated – to complete the action being requested."

-Gartner's Continuous Adaptive Risk & Trust Assessment (CARTA)

05.

Enable Secure Access to All Apps

Give users secure and consistent access to all applications, services and platforms, no matter where they're hosted.

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Protect Your Investments

You may be a cloud-forward organization, or a large enterprise with a complex mix of both cloud and legacy on-premises infrastructure and applications. Whatever it is, make sure you can protect access to all of it with MFA, contextual access policies, and device visibility and controls.

Remote Access

The shift to cloud infrastructure has made it challenging for organizations to apply stronger access controls across hybrid and multi-cloud environments.

Your solution should simplify and keep the user login experience consistent, no matter where users are located, when they're connecting to various systems and applications hosted in different cloud environments.

Make sure you can secure access to:



Multi-cloud environments, such as Azure,
AWS and Google Cloud Platform



Infrastructure, dev/DevOps environments and internal Linux servers



HTTPS web applications and

SSH servers



Virtual private network (VPN) and remote access applications

Enforce stronger security controls to only allow managed, up-to-date devices access to infrastructure and developer environments.

Cloud/Identity Access

Secure access to all of your cloud apps such as Office 365, Google, Box, Dropbox, Slack, and more, as well as access to any existing single sign-on (SSO), identity providers and federation services. Make sure your solution provides secure access to any SAML 2.0-enabled cloud application.

Best practices recommend securing access to these apps by separating your primary authentication method from your secondary (using MFA). Shift away from depending solely on a primary authentication provider to avoid a vendor-based breach that can risk exposing both primary and secondary authentication.

Secure Single Sign-On (SSO)

For a consistent login experience, let your users log in once to access all of their cloud and internal work applications with a secure single sign-on (SSO) solution.

Protect your SSO with MFA and contextual access policies, and check the security of your users' devices each time before granting access.



Secure access to all applications, services and platforms – whether multi-cloud, on-prem, custom, remote access or VPN.

Establish User Trust

Verify the identity of your users with strong multi-factor authentication that provides flexible, broad coverage for every type of user.

Multi-Factor Authentication

Eliminate the threat of attacks that stem from compromised credentials with Duo's easy and effective multi-factor authentication.

Duo's intuitive MFA makes enrollment and secure logins easy for users, reducing friction to their workflow. Users can quickly tap a button on a <u>Duo Push</u> notification sent to their smartphone via the <u>Duo Mobile</u> authentication app to verify their identity.

For All Types of Users

Duo's MFA works well for all user groups in the enterprise, including employees, contractors, vendors, customers, partners, etc., supporting user group-specific access policies.

Designed to support every user login scenario from offline to limited cell service and internet connectivity, Duo offers many different **MFA methods**, including mobile apps, push notifications, offline options, **biometric-based WebAuthn**, security keys and more.

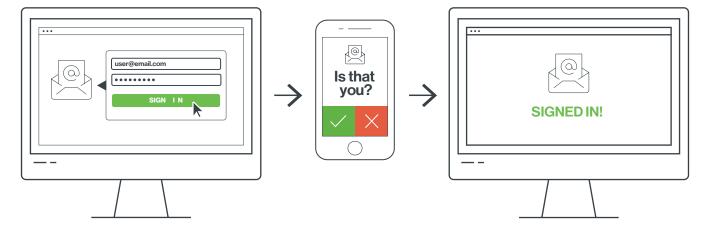
Plus, using Duo's access policies, your admins can require the use of certain methods for access to more sensitive applications for higher assurance of your users' identities.

Easy to Deploy

Admins benefit from Duo's native integrations, easy cloud-based setup and low maintenance solution. Duo's automated sign-up options such as <u>user self-enrollment</u> and Active Directory sync options allow for scalable user provisioning. To reduce help desk tickets and management, Duo's <u>self-service portal</u> lets users quickly and easily manage their own authentication devices.

Duo's Zero Trust for the Workforce

Duo provides the foundation for a zero-trust security model by providing user and device trust before granting access to applications – ensuring secure access for any user and device connecting to any application, from anywhere. Each time a user logs into an application, the trust of their identity and security of their device is checked by Duo, before granting access to only the applications they need. Duo gives you adaptive policies and controls to make access decisions based on user, device and application risk.



User Trust

Gain Visibility Into User Devices

Get a detailed overview of your users' devices with Duo's **endpoint visibility** and a **single view** of overall security status with Duo's Admin Panel that flags risky devices.

Across Every Platform

Get **complete visibility** into mobile, laptop, desktop and PC devices across every platform (Windows, Mac, iOS, Android and Chrome). Identify and monitor corporate and personally-owned devices to get insight into their security posture.

Support BYOD & Mobile

Get greater BYOD insight and control with Duo's platform that detects and tracks every device accessing protected applications, including desktop, laptop and mobile – without using an agent.

Identify both corporate IT-managed and personally-owned devices with Duo's **Trusted Endpoints**. Use existing device management infrastructure to establish and enforce device trust with Duo's integrations with Active Directory, AirWatch, Google, Jamf, Landesk, MobileIron and Sophos without the need to deploy and manage a complex PKI certificate infrastructure.

Centralized Dashboard

Admins get one centralized, intuitive interface to easily manage users, devices and policies globally, as well as security reports and logs for compliance audits.

Duo's <u>detailed reports</u> give admins data on user behavior and risky devices, as well as user, admin and telephony data – all easily integratable with existing security information and event management (SIEM) systems.



Establish Device Trust

Duo provides administrators with visibility into user and device risks and provides the ability to apply controls that prevent threats and risky devices from gaining access to sensitive applications and data.

Risk-Based Device Access

Admins can support BYOD policies by marking endpoints as **trusted or untrusted**, while enforcing policies that require stronger security or limit access by untrusted devices.

Establish Mobile Device Trust

Using **Duo Mobile for Trusted Endpoints**, you can block devices from accessing your applications based on:

- + OS, browser and plugin versions and how long they've been out of date
- + Status of enabled security features (configured or disabled):
- + Full disk encryption
- + Mobile device biometrics (Face ID/Touch ID)
- + Screen lock
- + Tampered (jailbroken, rooted or failed Google's SafetyNet)

The Duo Mobile app installed on your users' phones can serve as your Android/iOS managed device verification tool.

Notify Users to Update Risky Devices

To ease the burden on your help desk team and reduce support tickets, Duo's <u>Self-Remediation</u> notifies and assists users to update any out-of-date devices. Inform users they'll be denied access in a certain number of days unless they update, and provide a direct link to update their software to close security gaps faster.



User Trust

Enforce Adaptive Policies

Duo gives you the controls to limit access by risky endpoints and users to applications based on conditional risk (adaptive authentication).

Role-Based Access Policies

The principle of least privilege means limiting access to data and applications by only those people that need access to do their job. Duo allows you to set role-based access controls and restrict access to applications based on users' roles and job responsibilities.

For example, you can use Duo's policy framework to ensure only developers have access to critical infrastructure hosted in AWS – and that they can only access it using corporate-issued devices running the latest operating system, using the secure MFA method Duo Push.

App-Specific Policies

Enforce the use of more secure MFA methods (Duo Push, U2F, etc.) for access to high-risk applications and services (like those with financial, health, HR or other sensitive data) for a higher level of assurance of your users' identities. Require users to authenticate for every new session, prompting users after a set amount of time.

User Location

To comply with regional data privacy laws, you may need to enforce access policies based on location. To enable you to do that, Duo lets you set policies to grant or deny access to your applications based on where the user/device is coming from (a set of IP address ranges).

You can also require MFA for certain locations. Plus, Duo enables you to block authentication attempts to your applications from anonymous networks like Tor and proxies.

Enable Secure Access to All Apps

Duo provides <u>broad coverage across every application</u>, with out-of-the-box integrations for ease of setup with all types of apps – from legacy to modern to custom tools. For custom applications, Duo also offers APIs, WebSDKs and support for other protocols to allow you to extend Duo's security platform to protect proprietary services.

Duo provides flexible, frictionless access to hybrid and multi-cloud environments, allowing you to apply a zero-trust security approach for remote access to cloud infrastructure and corporate applications.

Remote Access

Secure against compromised credentials and protect access to your remote access gateway providers with Duo's integrations for virtual private networks (VPNs), virtual desktop infrastructure (VDI) and proxies such as Cisco AnyConnect, Juniper, F5, Citrix and more.

Cloud/Identity Access

As organizations migrate their applications and infrastructure to the cloud, Duo can fully protect both a hybrid and multi-cloud environment. Duo provides users with consistent remote access to multi-cloud and hybrid environments, including cloud infrastructure providers, as well as on-premises and cloud applications.

Duo supports cloud access use cases, such as developers accessing Amazon Web Services (AWS) and contractors who need remote access to internal applications. Duo's MFA also integrates with other SSO provides like Ping, Azure, Okta, Oracle and Shibboleth; providing identity integration with AD and SAML.

Secure Single Sign-On (SSO)

Users get a consistent login experience with Duo's single sign-on that delivers centralized access to both on-premises and cloud applications. Reduce password fatigue and increase user productivity by enabling your users to log in just once to Duo's single-sign-on (SSO) to access all of their apps. Duo's secure SSO checks device security every time before granting access to each application

Tech Partnerships

Duo's technology and security partnership ecosystem makes it easy for you to eliminate complexity while protecting your existing IT investments. Our tech partners (Microsoft, Cisco, Workday, Citrix, VMware and many others) include identity and access management; network and remote access; endpoint management and security; detection and response; as well as popular business applications.

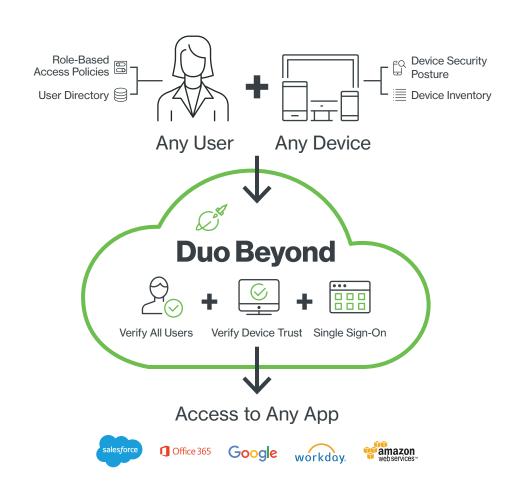
Begin your zero-trust journey with

Duo Beyønd

In the **Duo Beyond edition**, you'll receive:

Full-featured two-factor authentication for every organization:

- + Protect logins with Duo's MFA
- + Insight into an overview of **device** security hygiene
- + Manage Duo's solution with Admin APIs
- + Duo's secure single sign-on (SSO)
 provides a consistent user login workflow
 across all applications
- Protect access to both on-premises and cloud applications



Essential access security suite to address cloud, BYOD and mobile risks:

- + Complete visibility into both mobile and desktops, including corporate-managed and unmanaged (personally-owned) devices to support BYOD policies
- Mobile device breakdown with visibility into enabled security features and tampered or unencrypted devices
- + Enforce rules on who can access which applications, under what conditions (adaptive authentication)
- + Enforce a policy to allow only managed devices access to sensitive applications
- + Provide modern remote access to multicloud environments (on-premises, Azure, AWS, Google Cloud Platform) while enforcing zero-trust security principles
- + Notify users to update their devices based on device access policies
- Identify users vulnerable to phishing through **phishing campaigns**
- Full-featured dashboards and custom reports for compliance audits and ease of administrative management

Duo Security

Duo is a cloud-based security platform that protects access to all applications, for any user and device, from anywhere. It's designed to be both easy to use and deploy, while providing complete endpoint visibility and control.

Duo verifies users' identities with strong multi-factor authentication. Paired with deep insights into your users' devices, Duo gives you the policies and control you need to limit access based on endpoint or user risk. Users get a consistent login experience with Duo's single sign-on that delivers centralized access to both on-premises and cloud applications.

With Duo, you can protect against compromised credentials and risky devices, as well as unwanted access to your applications and data. This combination of user and device trust builds a strong foundation for a zero-trust security model.

Get a <u>free trial for 30 days</u> and quickly protect all users, devices and applications. Or, **contact us**.

Cisco Zero Trust

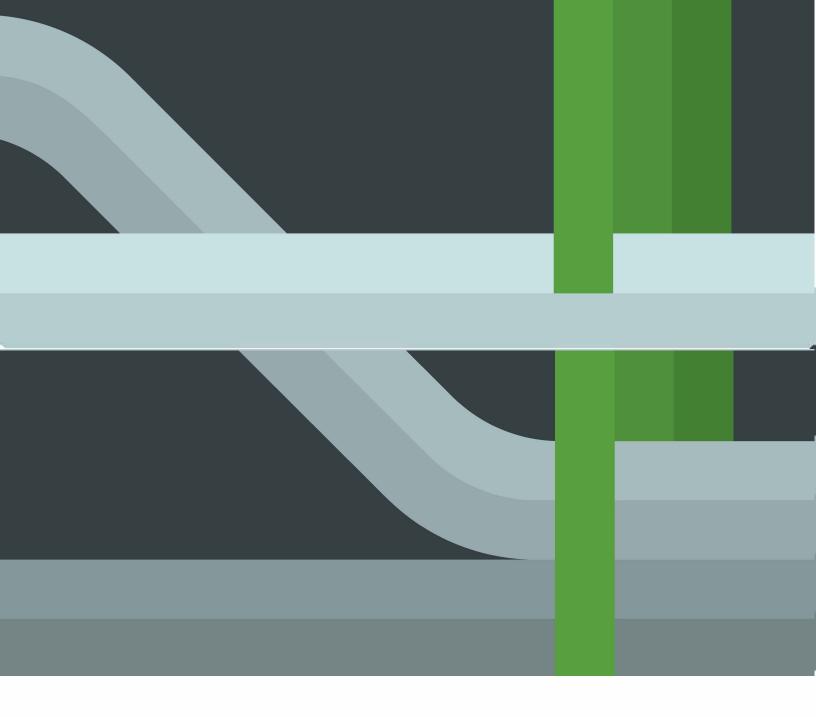
Cisco Zero Trust provides a comprehensive approach to securing all access across your applications and environment, from any user, device and location. It protects your workforce, workloads and workplace.

- + To protect the workforce, Cisco ensures only the right users and secure devices can access applications.
- + To protect workloads, Cisco secures all connections within your apps, across multi-cloud.
- + To protect the workplace, Cisco secures all user and device connections across your network, including IoT.

This complete zero-trust security model allows you to mitigate, detect and respond to risks across your environment.

Learn More About Cisco Zero Trust

Learn more about Duo Beyond in our documentation.



People Connecting People

IE provides nnovative tech solutions to help you connect with the people that matter most.



