Alcatraz AI Tailgate Intelligence

Platform v2.5.1

Rev. 1

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Introduction

Tailgating Detection on Alcatraz AI's Rock is powered by AI and Machine Learning. The Rock is able to detect when bodies are entering or exiting the door. The Alcatraz AI Facial authentication system is able to identify enrolled (known) users that enter and flag unknown users or users that enter without authenticating and display these alerts on a cloud or on-premises Alcatraz Admin Portal. These alerts can also be configured to work with the organization's Access Control System (ACS).

Tailgating Detection flags *any* non-authenticated entry and displays these events in the Admin Portal. The Rock flags the following three types as non-authenticated entry:

Tailgating - an unauthenticated person follows an authenticated user through the door. The person tailgating can be an enrolled user or an unknown user.
Crossing - a person exits the door and another person gains entry. The person that gained entry before the door closed can be an enrolled user or an unknown user.
Unauthorized Entry - a person that cannot be authenticated gains entry. The person can be an enrolled user or an unknown user.

Requirements

Tailgating Detection is enabled on every Rock and this feature works once the Rock is online and onboarded to the Admin Portal. The Rock can be mounted on either side of the door.

Assumptions

- The Rock is properly installed with the narrow side of the Rock angled toward the door (default setup) or, in corridor setup, with the narrow side angled away from the door on the perpendicular wall.
- The Rock is installed ~8 inches (20 cm) from the door opening.
  Note: If the Rock is installed farther than 8 inches, please refer to the section on Rock Distance From the Door.
- The door width is the standard 3 feet (90 cm).
  Note: If the door is wider than 3 feet, please refer to the section on Extra Wide Doors.
- The door is not blocking the Rock as it is opened.

Tailgating Detection Basic Operation

Tailgating Detection works in the following modes:

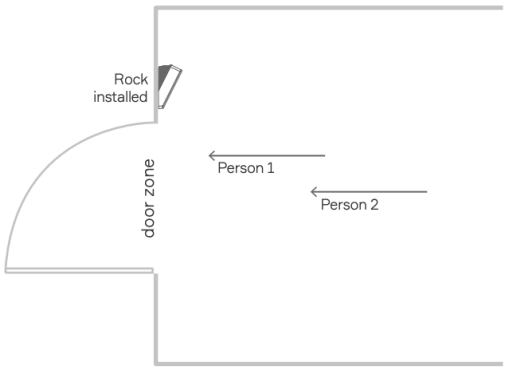
Demo
Single Factor Authentication (1FA)
Face Only (1FAF)
Two Factor Authentication (2FA)

An unauthenticated tailgater can be a completely **unknown** person (not enrolled) or a **known** (enrolled) user that did not properly authenticate in order to gain entry.
To properly authenticate, the known user must use their face (1FAF), face OR badge (1FA), or face AND badge (2FA) and receive a green authentication icon on the OLED screen. If a user enters without authenticating, they will be flagged.

Examples of known tailgating are when the known user's face is partially blocked, they walk by the Rock very quickly, or the lighting is not ideal - situations where the Rock did not get enough of a clear image of their face to be confident enough to authenticate them. It is important to note that these are *possible* known tailgaters because it is determined from only a few images. If a known user's face is completely blocked or if the conditions are too poor for the Rock to gather enough data of their face, they will be marked as an unknown tailgater.

Tailgating

Tailgating Detection is defined by Alcatraz as any unauthenticated person following an authenticated person into the secured space before the door closes.



After Person 1 authenticates and enters, a tailgating timeout begins. Any person who enters within the timeout that does NOT authenticate is considered a tailgater. The timeout restarts after each new tailgater enters, therefore allowing multiple tailgaters to get flagged. (The tailgating timeout can be adjusted - see Tailgating Timeout)

Tailgating Scenario 1:

1. Person 1 is an enrolled user and gets authenticated at the Rock; the door opens and person 1 enters the secured space
2. Person 2 is NOT an enrolled user and tailgates person 1

Event	Badge ID	Device Name	Timestamp
Tailgating - Unknown User	-	Lab QA	2022-10-20 05:14:11
Face Authenticated (1FA)	44:5561	Lab QA	2022-10-20 05:14:09

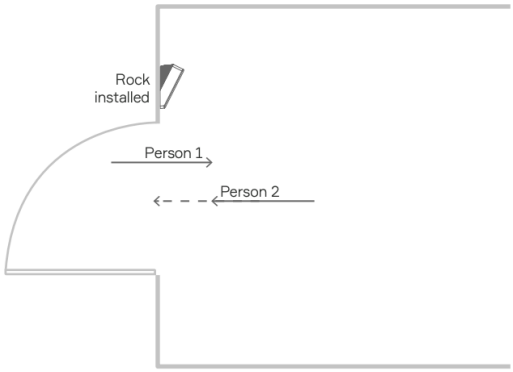
Tailgating Scenario 2:

1. Person 1 is an enrolled user and gets authenticated at the Rock; the door opens and person 1 enters the secured space
2. Person 2 is an enrolled user and tailgates person 1 without pausing to authenticate

Event	Badge ID	Device Name	Timestamp
Tailgating - Possible Known User	36:5561	Lab QA	2022-10-20 05:10:52
Face Authenticated (1FA)	44:5561	Lab QA	2022-10-20 05:10:48

Crossing

Crossing is defined by Alcatraz as a person exiting the secured space and another person gaining entry before the door fully closes.



Crossing Scenario 1:

1. Person 1 exits from the secured space
2. Person 2 is NOT an enrolled user and enters the secured space before the door closes

Event	Badge ID	Device Name	Timestamp
Crossing - Unknown User	-	Lab	2022-10-31 08:17:01

Crossing Scenario 2:

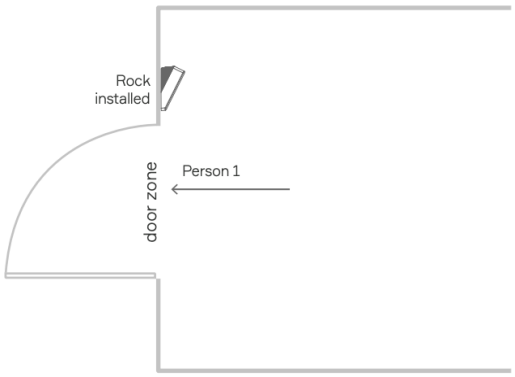
1. Person 1 exits from the secured space
2. Person 2 is an enrolled user and enters the secured space without authenticating before the door closes

Event	Badge ID	Device Name	Timestamp
Crossing - Possible Known User	48:6219	Lab	2022-11-02 09:53:39

Unauthorized Entry

Unauthorized Entry is defined by Alcatraz as a person that cannot be authenticated by the Rock gaining entry into the secured space.

Unauthorized Entry happens when one person enters the secured space through the door alone when they have not properly authenticated. This is most often seen if the door is not locked, is propped open, or someone opens the door for someone from the other side. This event will also trigger if a person enters behind an authenticated user after the Tailgating Timeout has ended.



Unauthorized Entry Scenario 1:

1. Person 1 is NOT an enrolled user and enters the secured space (see possible situations listed above)

Event	Badge ID	Device Name	Timestamp
Unauthorized Entry - Unknown User	-	Lab	2022-10-31 05:13:12

Unauthorized Entry Scenario 2:

1. Person 1 is an enrolled user and enters the secured space without authenticating

Event	Badge ID	Device Name	Timestamp
Unauthorized Entry - Possible Known User	42:5563	Lab	2022-11-02 07:26:30

Tailgating Specs

Tailgating Detection works reliably:

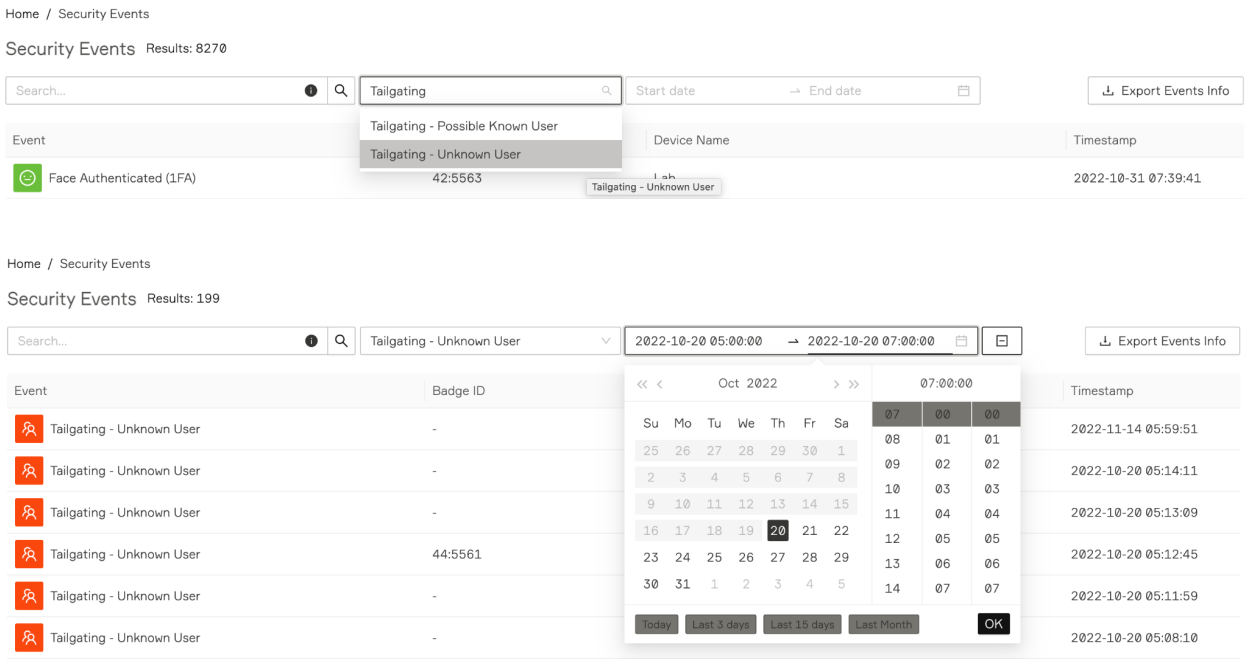
- in ambient light greater than 10 lux
- for heights ranging from 4’10” to 7’0” (148cm to 213cm)

- when the tailgater enters greater than 11.8” (30cm) and less than 6 feet (1.8m) from the device (Note: doors wider than 3 feet need parameter adjustments, please refer to the section on “Extra Wide Doors” for details)
- at pedestrian speeds of up to 6.7 feet/second (2 meters/second)
- when the tailgater is more than 2 inches (51mm) behind an authorized person
- with 2+ people
- when the Rock is 8 inches from the door (if it is farther than 8 inches, some parameters need to be adjusted, please refer to the section on “Rock Distance From the Door” for details)

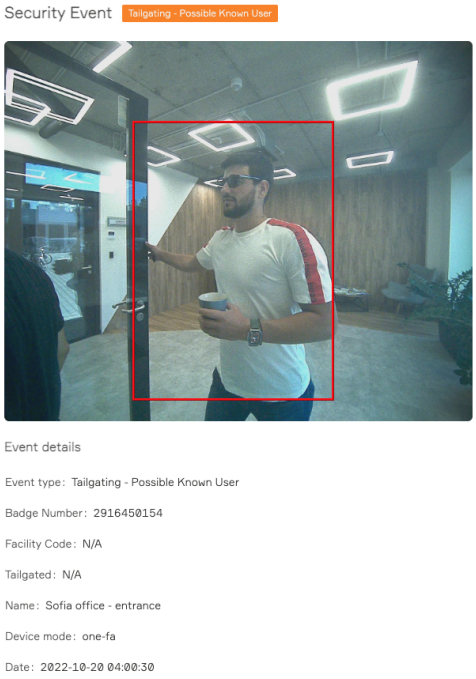
Tailgating Events in the Admin Portal

All tailgating event types (Tailgating, Crossing, and Unauthorized Entry) that are flagged are sent to the organization’s Admin Portal. These can be viewed under the “**Security Events**” tab in the left sidebar on the Admin Portal.

Security Events are listed chronologically from most recent to oldest. Events can be filtered by date/time in order to see any event from a certain time range. Events can also be filtered by event type; for tailgating, all three types (Tailgating/Crossing/Unauthorized Entry) can be selected.



Click on an event to see more details about the tailgating event. An image will be provided as a snapshot of the event with a red box drawn around the tailgater.



Under the event image are the Event Details. The identity of tailgaters is provided whenever possible if the tailgater is enrolled in the system and there is a view of their face.

Badge Number: will display “N/A” if the person is unknown; if the person is possibly known, this field will display the badge number of the enrolled user that has a face match

Tailgated: currently displays “N/A” (known issue)

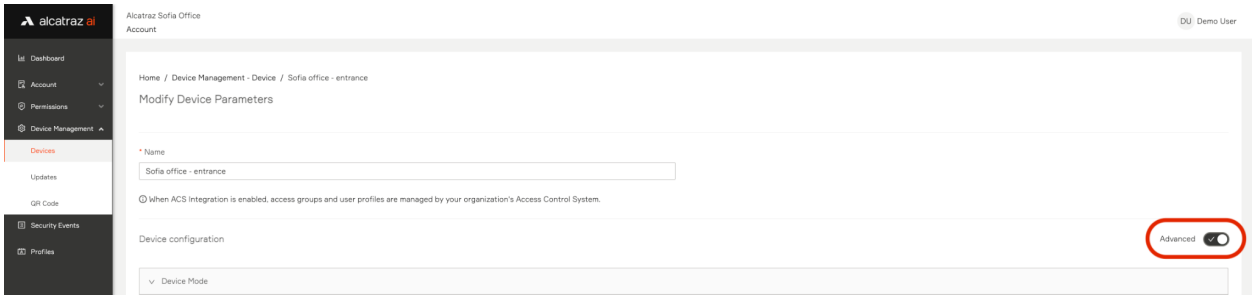
Configurations for Tailgate Detection

Tailgating Timeout

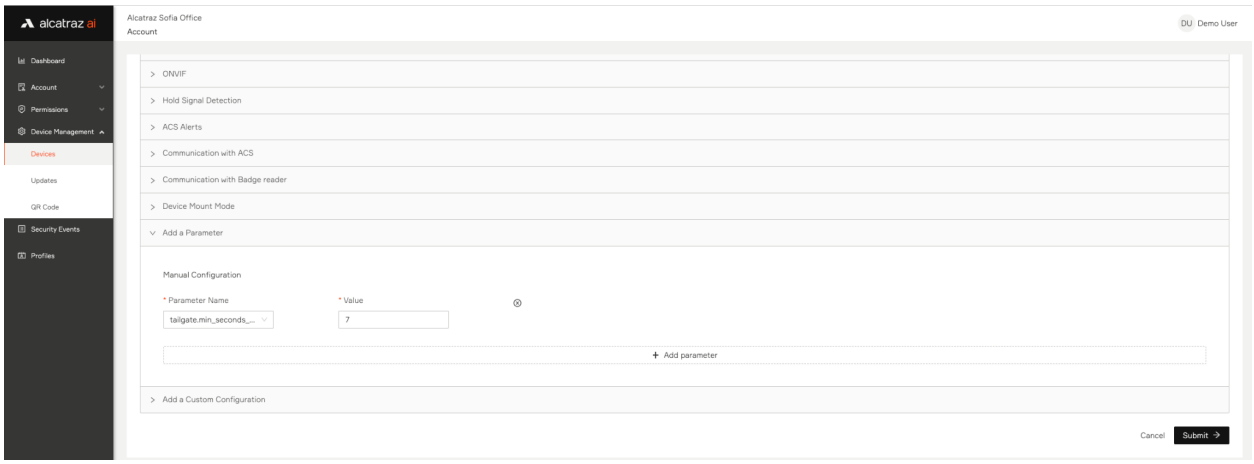
Once a user properly authenticates and enters, the tailgating timer begins. Any person who does NOT authenticate within the timeout is flagged as a tailgater. The tailgating timer resets after each new person enters. The default is 5 seconds. If a longer timeout is desired (for example, the door takes longer than 5 seconds to close and lock behind a user), this can be adjusted. Note that the timer begins once the user passes the Rock, not when they authenticate.

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.

4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.



5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.min_seconds_between_entries*, and for the Value, type in the number (in seconds) for the new tailgating timeout and then click on “Submit” at the bottom of the page.

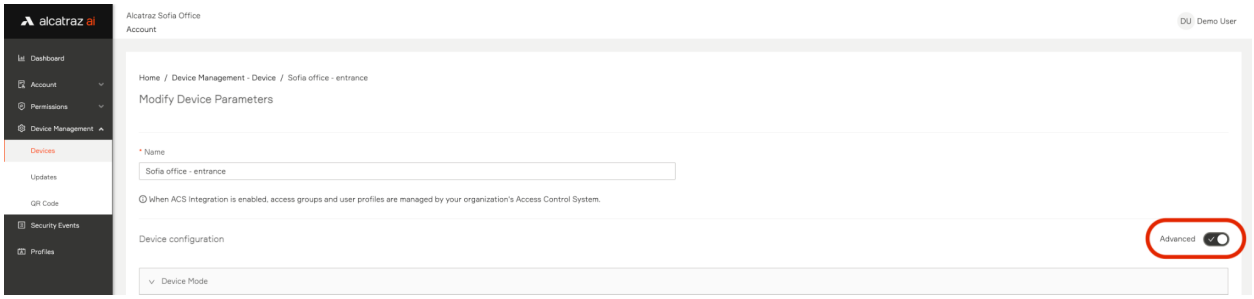


Crossing Timeout

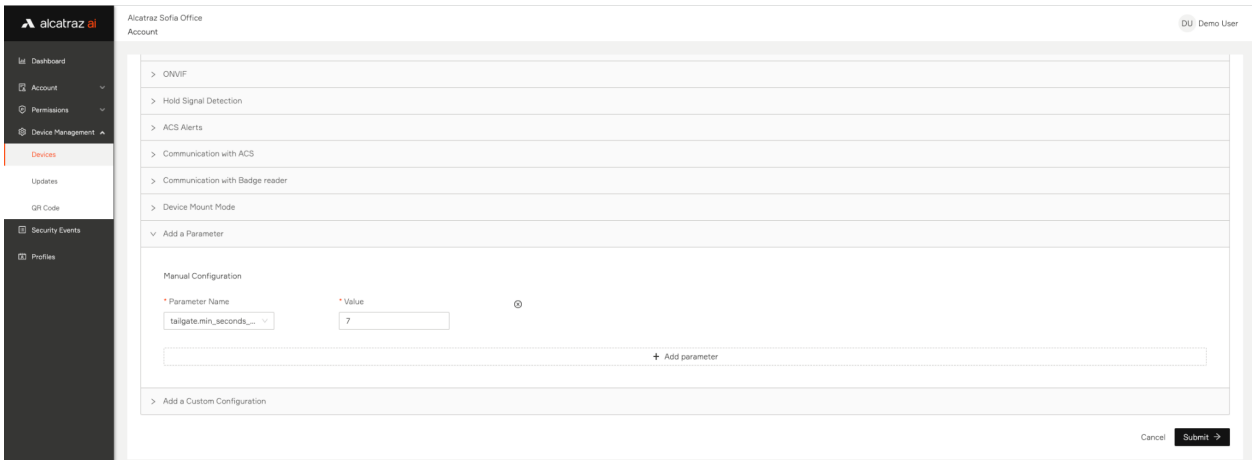
Similar to the tailgating timeout, the crossing timer begins as soon as a person exits the door. Any person who enters but does NOT authenticate within the crossing timeout is flagged as a tailgater (crossing). The default is 5 seconds. If a longer timeout is desired (for example, the door takes longer than 5 seconds to close and lock behind a user), this can be adjusted.

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a crossing timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.

4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.



5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.min_seconds_after_exit*, and for the Value, type in the number (in seconds) for the new crossing timeout and then click on “Submit” at the bottom of the page.

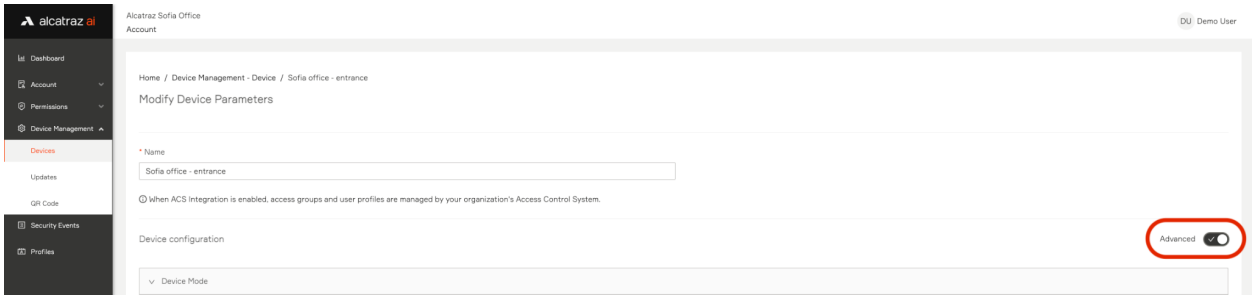


Allowed Time to Enter

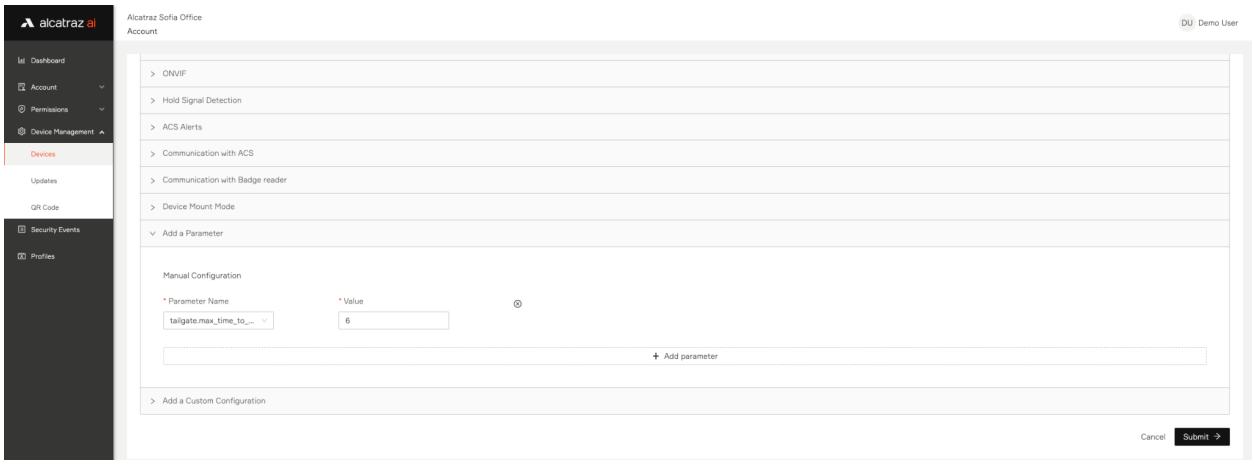
Once an enrolled user has authenticated, they have a certain amount of time to enter before they must re-authenticate. If they manage to enter after this timeout (depending on how long the door remains unlocked), they will be considered an Unauthorized Entry. The default is 5 seconds. If a longer timeout is desired (for example, it takes longer than 5 seconds to get from in front of the Rock and through the door), this can be adjusted.

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.

4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.



5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.max_time_to_enter*, and for the Value, type in the number (in seconds) for the new time-to-enter timeout and then click on “Submit” at the bottom of the page.

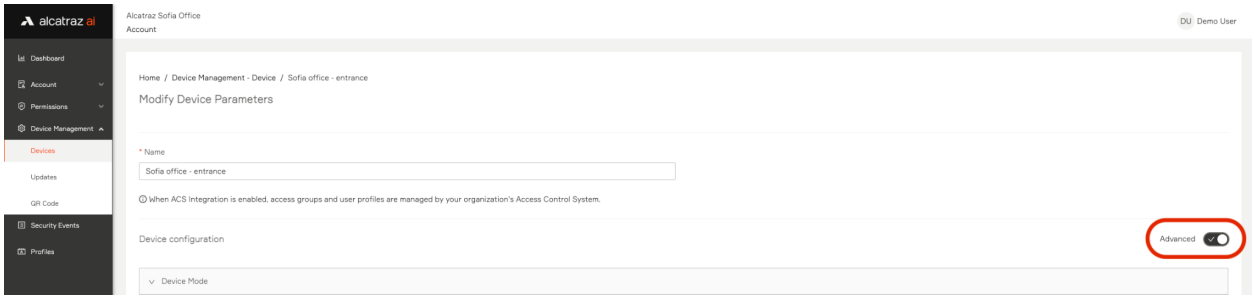


Flagging Authorized Tailgaters

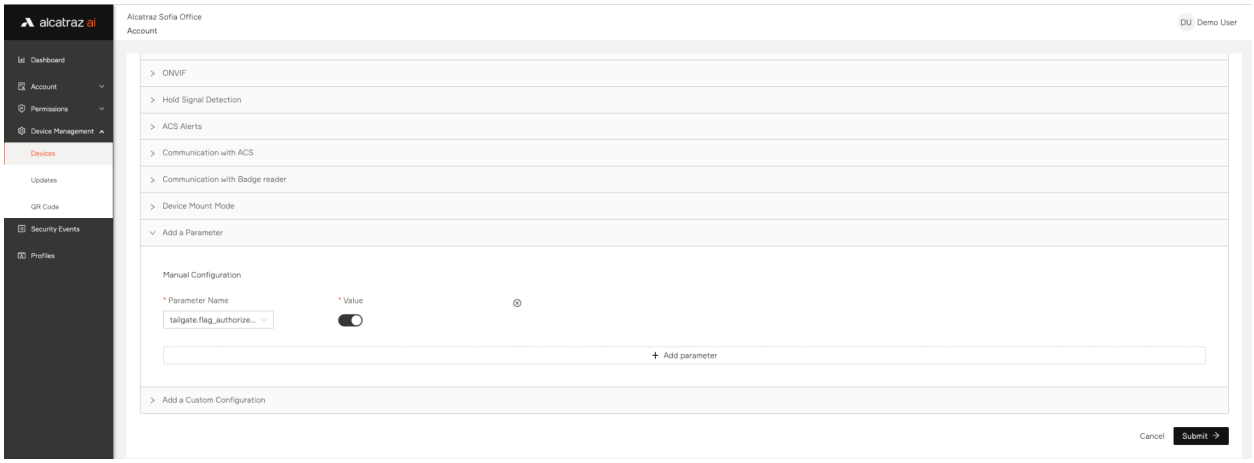
Users that have properly authenticated yet enter within a tailgating timeout are NOT flagged as tailgaters. If it is desired that *any* person be flagged within a tailgating timeout despite some tailgaters being enrolled and properly authenticating before entering, there is a configuration for this feature to be turned on.

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.

4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.



5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.flag_authorized_tailgaters*, and click the toggle to the right to set this Value to true and then click on “Submit” at the bottom of the page.



Settings for Specific Use Cases

The Tailgating Detection feature is designed to work when the Rock is mounted next to the doorway with standard 3 foot (90cm) wide doors and with the Rock mounted within ~8 inches (20cm). If the setup is different than this, some parameters need to be adjusted to make Tailgating Detection more reliable or to have fewer false events, based on the situation.

Extra Wide Doors

Tailgating Detection will not cover doors that are wider than 3 feet without parameter adjustments. The maximum width that the Rock can cover is 6 feet (this will cover double-wide doors).
Please note that double-doors that pull open from the center will block the Rock if the door closest to it is opened; Tailgating Detection cannot work in this case.

To adjust the tailgating parameters for extra-wide doors:

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.

3. Click on “**Modify**” at the top right side of the Rock’s page.
4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.
5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.max_door_width*, and for the Value, type in the number (in meters) from the table below.
7. Click to add another parameter “+ Add parameter”, select *tailgate.max_door_depth*, and for the Value, type in the number (in meters) from the table below and then click on “Submit” at the bottom of the page.

Door Width (with Rock 8 in/0.2m from door)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
3 feet/0.9m (standard single)	1.2 (default)	0.4 (default)
4 feet/1.2m	1.5	0.5
5 feet/1.5m	1.8	0.6
6 feet/1.8m	2.1	0.6

Note: It is not recommended to set the tailgate.max_door_depth at 0.7m or greater, as doing so may result in more frequent false tailgating events from people walking near the door but not entering

Rock Distance From the Door

If the Rock is *farther* than 8 inches from the door opening (measured from the center of the Rock), this extra distance must be accounted for.
For every extra 4 inches the Rock is from the door opening, the *tailgate.max_door_width* should be increased by 0.1m.
To adjust the tailgating parameters for Rocks farther away from the door opening:

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.
4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.
5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.door_start_offset*, and for the Value, type in the number (in meters) from the table below that corresponds to the door’s width.
7. Click to add another parameter “+ Add parameter”, select *tailgate.max_door_width*, and for the Value, type in the number (in meters) from the tables below that corresponds to the door’s width.
8. Click to add another parameter “+ Add parameter”, select *tailgate.max_door_depth*, and for the Value, type in the number (in meters) from the table below that corresponds to the door’s width and then click on “Submit” at the bottom of the page.

For a 3 feet-wide door:

Distance between Rock and door	**tailgate.door_start_offset** (in meters)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
0-8 inches/0-0.2m	0.2 (default)	1.2 (default)	0.4 (default)
8-12 inches/0.2-0.3m	0.3	1.3	0.4 (default)
12-16 inches/0.3-0.4m	0.4	1.4	0.5
16-20 inches/0.4-0.5m	0.5	1.5	0.5

For 6 feet-wide double doors:

Distance between Rock and door	**tailgate.door_start_offset** (in meters)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
0-8 inches/0-0.2m	0.2 (default)	2.1	0.6
8-12 inches/0.2-0.3m	0.3	2.2	0.6
12-16 inches/0.3-0.4m (not recommended)	0.4	2.3	0.7
16-20 inches/0.4-0.5m (not recommended)	0.5	2.4	0.7

Note: It is not recommended to set the tailgate.max_door_depth at 0.7m or greater, as doing so may result in more frequent false tailgating events from people walking near the door but not entering.

For example, if the Rock is 10 inches from the door and the doorway is a 3-ft wide standard door:
tailgate.door_start_offset 0.3
tailgate.max_door_width 1.3
tailgate.max_door_depth 0.4

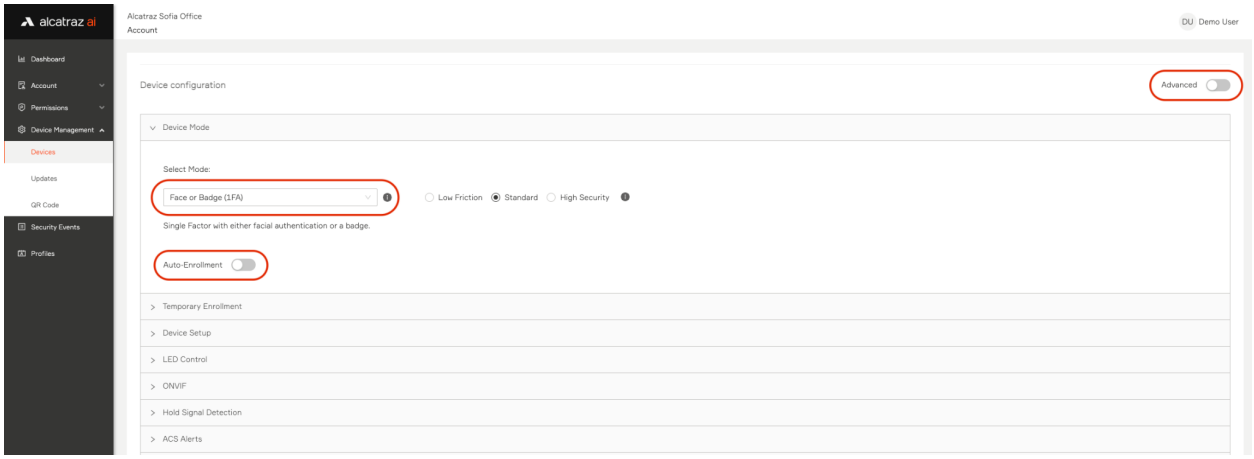
Badge-Only Mode

In cases where it is desired for the Rock to be used without facial authentication, the Rock can be set to accept badges only. No users are enrolled on the device, and they must use a valid badge to enter. Tailgating Detection works in this case. A user scans their badge at the reader and they have 5 seconds to enter the secured space (this can be adjusted; see Allowed Time to

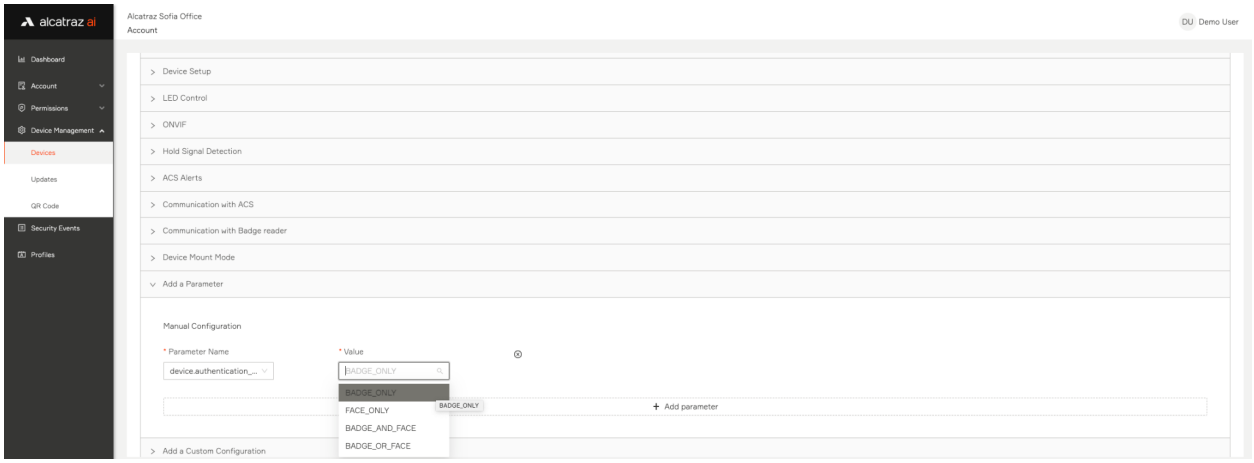
Enter). Once they enter, the tailgating timer begins. Crossing and Unauthorized Entry events will trigger as expected if no badges are scanned.

The device must be in 1FA Single-Factor Authentication Mode and then a separate parameter, *device.authentication_mode* must be set to BADGE_ONLY.

1. From the Admin Portal, select "**Device Management**" from the list on the left sidebar, and then select "Devices".
2. From the list of Rocks, select the one that will be used for badge-only mode.
3. Click on "**Modify**" at the top right side of the Rock's page.
4. Verify that the Rock is in Mode "Face or Badge (1FA)" and that Auto-Enrollment is turned off.



5. Click on the "**Advanced**" toggle to the right side of the Device configuration heading.
6. Scroll down to "**Add a parameter**", and click "+ Add parameter".
7. In the drop-down list, select *device.authentication_mode*, and for the Value, select "BADGE_ONLY" and then click on "Submit" at the bottom of the page.



Corridor Mode

In Corridor Mode the Rock is mounted perpendicular to the door, with the narrow side facing away from the door. In instances where the Rock is installed in Corridor Mode, tailgating

operates as described in basic operation but rather than users passing by the narrow side to enter the door, they pass by the wide side.

For tailgating to work correctly in this mode, Corridor Mode must be selected under “Device Mount Mode” in the device’s settings.

For doors wider than standard, as long as the Rock is within 8 inches/20 cm from the door opening (the direction parallel to the door), the only parameter that needs to be adjusted is the *tailgate.max_door_width*.

To adjust the tailgating parameter for extra-wide doors in corridor mode:

1. From the Admin Portal, select “**Device Management**” from the list on the left sidebar, and then select “Devices”.
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on “**Modify**” at the top right side of the Rock’s page.
4. Click on the “**Advanced**” toggle to the right side of the Device configuration heading.
5. Scroll down to “**Add a parameter**”, and click “+ Add parameter”.
6. In the drop-down list, select *tailgate.max_door_width*, and for the Value, type in the number (in meters) from the table below and then click on “Submit” at the bottom of the page.

Door Width (with Rock 8 in/0.2m from door)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
3 feet/0.9m (standard single)	1.2 (default)	0.4 (default)
4 feet/1.2m	1.5	0.4 (default)
5 feet/1.5m	1.8	0.4 (default)
6 feet/1.8m	2.1	0.4 (default)

If the Rock is more than 8in/20cm away from the door (the direction parallel to the door), this extra distance must be accounted for.

For every 4 inches farther from the door, the *tailgate.max_door_width* should be increased by 0.1m.

To adjust the tailgating parameters for Rocks farther away from the door opening in corridor mode:

1. From the Admin Portal, select "**Device Management**" from the list on the left sidebar, and then select "Devices".
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on "**Modify**" at the top right side of the Rock's page.
4. Click on the "**Advanced**" toggle to the right side of the Device configuration heading.
5. Scroll down to "**Add a parameter**", and click "+ Add parameter".
6. In the drop-down list, select *tailgate.door_start_offset*, and for the Value, type in the number (in meters) from the table below that corresponds to the door's width.
7. Click to add another parameter "+ Add parameter", select *tailgate.max_door_width*, and for the Value, type in the number (in meters) from the tables below that corresponds to the door's width and then click on "Submit" at the bottom of the page.

For a 3 feet-wide door:

Distance between Rock and door	**tailgate.door_start_offset** (in meters)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
0-8 inches/0-0.2m	0.2 (default)	1.2 (default)	0.4 (default)
8-12 inches/0.2-0.3m	0.3	1.3	0.4 (default)
12-16 inches/0.3-0.4m	0.4	1.4	0.4 (default)
16-20 inches/0.4-0.5m	0.5	1.5	0.4 (default)
20-24 inches/0.5-0.6m	0.6	1.6	0.4 (default)

For 6 feet-wide double doors:

Distance between Rock and door	**tailgate.door_start_offset** (in meters)	**tailgate.max_door_width** (in meters)	**tailgate.max_door_depth** (in meters)
0-8 inches/0-0.2m	0.2 (default)	2.2	0.4 (default)
8-12 inches/0.2-0.3m	0.3	2.3	0.4 (default)
12-16 inches/0.3-0.4m	0.4	2.4	0.4 (default)
16-20 inches/0.4-0.5m	0.5	2.5	0.4 (default)

There is one other variable that is present in corridor mode that is not present in the standard mount: *the distance away from the wall perpendicular to the door.*

There are no parameter adjustments that can be altered if the Rock is mounted a certain distance away from the wall in this direction, but it must be noted that the farther away the Rock is perpendicular to the door, the more chances there are for false tailgating events.

Turnstile

When the Rock is set up on a turnstile with Alcatraz's pole mount, Tailgating Detection works as described in basic operation, however without a physical door, some adjustments may need to be made to account for the width of the turnstile lane so that tailgating events are not triggered by people walking by outside of the lane.

Measure the width of the inside of the turnstile lane (in meters) and add 0.2m to that measurement. This will be the value needed for the parameter change. (The default is 1.2 meters)

To adjust the tailgating parameter for turnstile lanes:

1. From the Admin Portal, select "**Device Management**" from the list on the left sidebar, and then select "Devices".
2. From the list of Rocks, select the one that needs a tailgating timeout adjustment.
3. Click on "**Modify**" at the top right side of the Rock's page.
4. Click on the "**Advanced**" toggle to the right side of the Device configuration heading.
5. Scroll down to "**Add a parameter**", and click "+ Add parameter".
6. In the drop-down list, select *tailgate.max_door_width*, and for the Value, type in the number (in meters) and then click on "Submit" at the bottom of the page.

The closer the Rock is to the gate on the turnstile, the better the performance will be.

Sending Tailgate Alerts to the ACS

Tailgating Alerts are automatically sent to the Admin Portal. If desired, these alerts can also be sent to the organization's ACS panel. The following tailgating alerts can be configured on the ACS Panel:

- Tailgating by Known User
- Tailgating by Unknown User
- Crossing
- Unauthorized Entry

Unique badge numbers are set on the Admin Portal, and then the ACS is configured to recognize these unique badge numbers as "fictitious" users that are used as the alerts.

For more information on how to configure Tailgate Alerts to the ACS, please refer to the Admin Portal Guide.

Known Limitations

- Doors that pull open will block the Rock, therefore Tailgating Detection cannot work.
- If the doors are non-frosted glass and do not contain logos or other graphics, Tailgating Detection *can* work, but it is not 100% reliable due to glass reflections, metal frames, etc.
- When a tailgater enters outside of the Field of View or is completely blocked - NO tailgate event is sent.

Corridor Mode specific:
Testing results show that if the Rock is within 20 inches/0.5m out from the wall with the door, false tailgating events will not likely occur if a person walks up to the door and then turns away rather than entering. If the Rock is farther away than 0.5m perpendicularly to the wall with the door, false tailgating events *are likely* to occur if people pass the Rock, approach the door, but turn away rather than entering.

Turnstile:
The farther away the Rock is from the gate, the more chances there are for false tailgating events, e.g. a user approaches the gate but it does not open so they back away - this can trigger Unauthorized Entry.