



PSI3541 2023

SISTEMAS EMBARCADOS DISTRIBUIDOS

AULA 04 11/04/2023

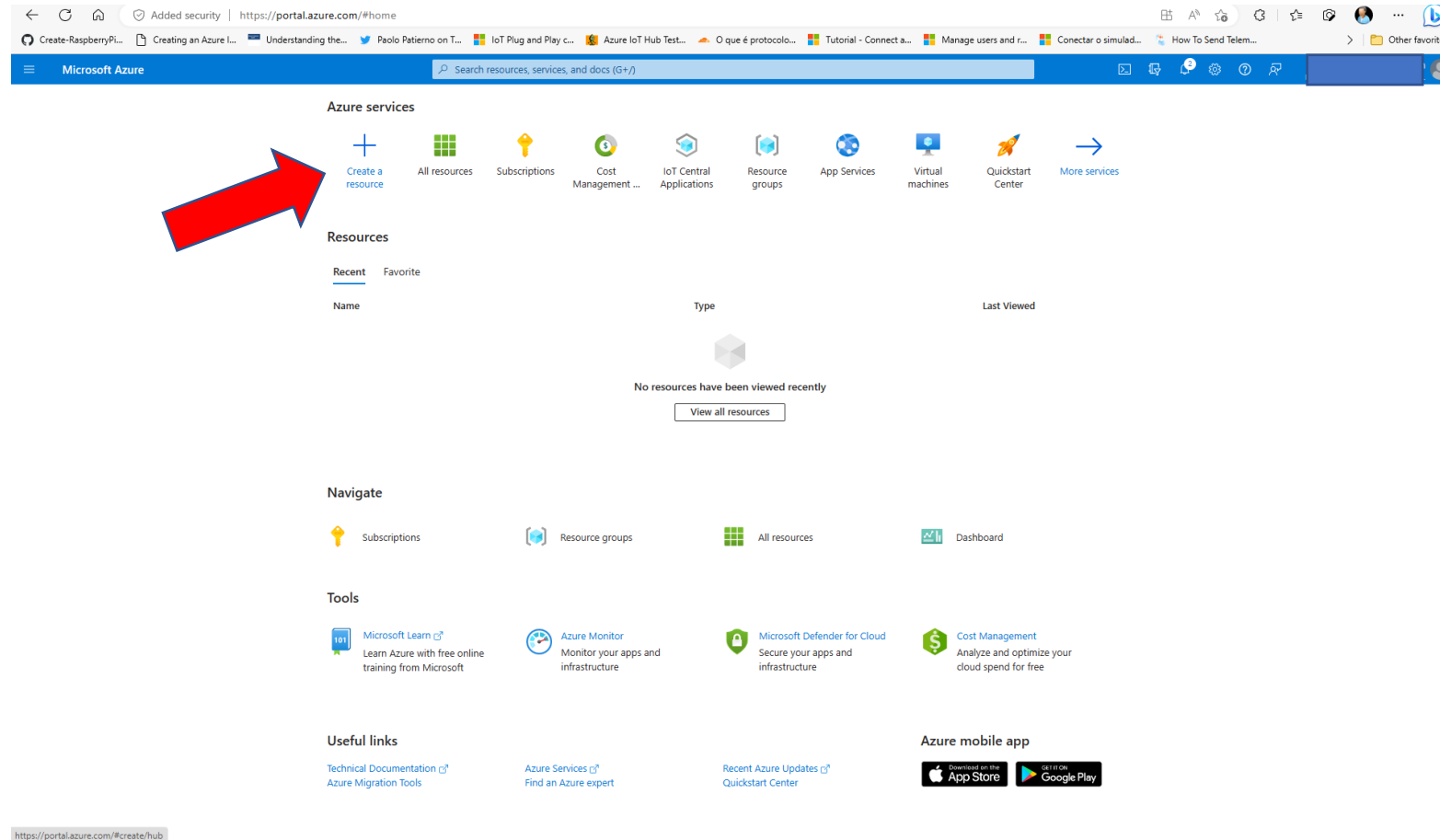
ATIVIDADE 4.1 DASHBOARD, REGRAS E ALARMES NO IOT CENTRAL

PROF. SERGIO TAKEO KOFUJI - KOFUJI@USP.BR

Atividade 4.1 Dashboard, Regras e Ações no IoT Central

- ❑ Conectar um smartphone como dispositivo de IoT à Plataforma AZURE IoT Central, seguindo o roteiro 3.1
- ❑ Configurar o DASHBOARD da Aplicação do IoT Central
- ❑ Configurar regras e ações para o dispositivo IoT no IoT Central
 - ✓ Criar uma regra que detecta quando um valor de telemetria passa um limite.
 - ✓ Configurar a regra para notificá-lo por email.
 - ✓ Usar o aplicativo de smartphone para testar a regra.

No AZURE Cloud, CRIAR um novo recurso



The screenshot shows the Microsoft Azure portal home page. A red arrow points to the 'Create a resource' button in the 'Azure services' section. The page layout includes a search bar, navigation tabs, and various service categories.

Azure services

- Create a resource
- All resources
- Subscriptions
- Cost Management
- IoT Central Applications
- Resource groups
- App Services
- Virtual machines
- Quickstart Center
- More services

Resources

Recent Favorite

Name	Type	Last Viewed
No resources have been viewed recently		

[View all resources](#)

Navigate

- Subscriptions
- Resource groups
- All resources
- Dashboard

Tools

- Microsoft Learn: Learn Azure with free online training from Microsoft
- Azure Monitor: Monitor your apps and infrastructure
- Microsoft Defender for Cloud: Secure your apps and infrastructure
- Cost Management: Analyze and optimize your cloud spend for free

Useful links

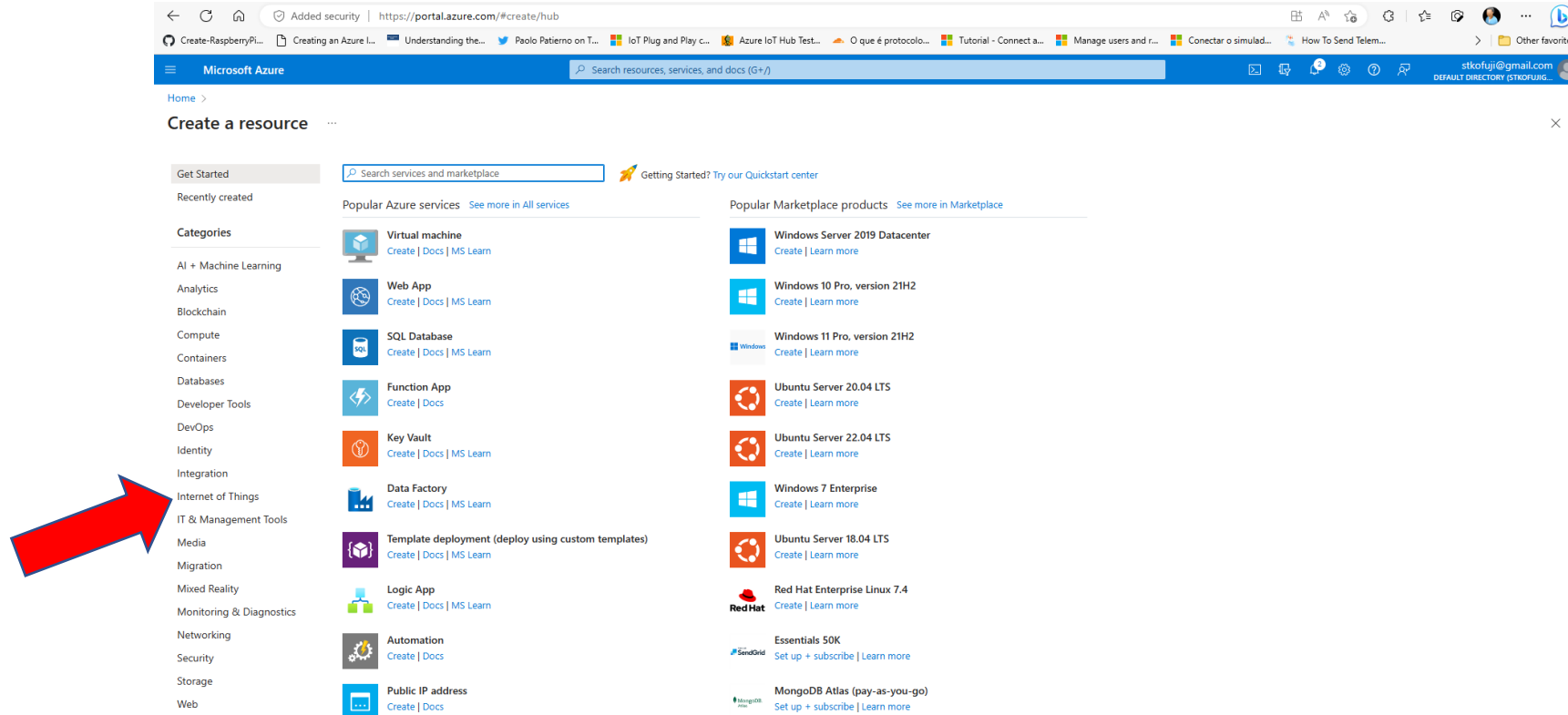
- Technical Documentation
- Azure Migration Tools
- Azure Services: Find an Azure expert
- Recent Azure Updates
- Quickstart Center

Azure mobile app

Download on the App Store | GET IT ON Google Play

https://portal.azure.com/#create/hub

Selecionar Internet of Things



The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and navigation links. The main content area is titled "Create a resource" and is divided into three columns: "Recently created", "Popular Azure services", and "Popular Marketplace products".

Categories (Left Sidebar):

- AI + Machine Learning
- Analytics
- Blockchain
- Compute
- Containers
- Databases
- Developer Tools
- DevOps
- Identity
- Integration
- Internet of Things** (highlighted with a red arrow)
- IT & Management Tools
- Media
- Migration
- Mixed Reality
- Monitoring & Diagnostics
- Networking
- Security
- Storage
- Web

Popular Azure services (Middle Column):

- Virtual machine (Create | Docs | MS Learn)
- Web App (Create | Docs | MS Learn)
- SQL Database (Create | Docs | MS Learn)
- Function App (Create | Docs)
- Key Vault (Create | Docs | MS Learn)
- Data Factory (Create | Docs | MS Learn)
- Template deployment (deploy using custom templates) (Create | Docs | MS Learn)
- Logic App (Create | Docs | MS Learn)
- Automation (Create | Docs)
- Public IP address (Create | Docs)

Popular Marketplace products (Right Column):

- Windows Server 2019 Datacenter (Create | Learn more)
- Windows 10 Pro, version 21H2 (Create | Learn more)
- Windows 11 Pro, version 21H2 (Create | Learn more)
- Ubuntu Server 20.04 LTS (Create | Learn more)
- Ubuntu Server 22.04 LTS (Create | Learn more)
- Windows 7 Enterprise (Create | Learn more)
- Ubuntu Server 18.04 LTS (Create | Learn more)
- Red Hat Enterprise Linux 7.4 (Create | Learn more)
- Essentials 50K (Set up + subscribe | Learn more)
- MongoDB Atlas (pay-as-you-go) (Set up + subscribe | Learn more)

Selecionar IoT Central Application

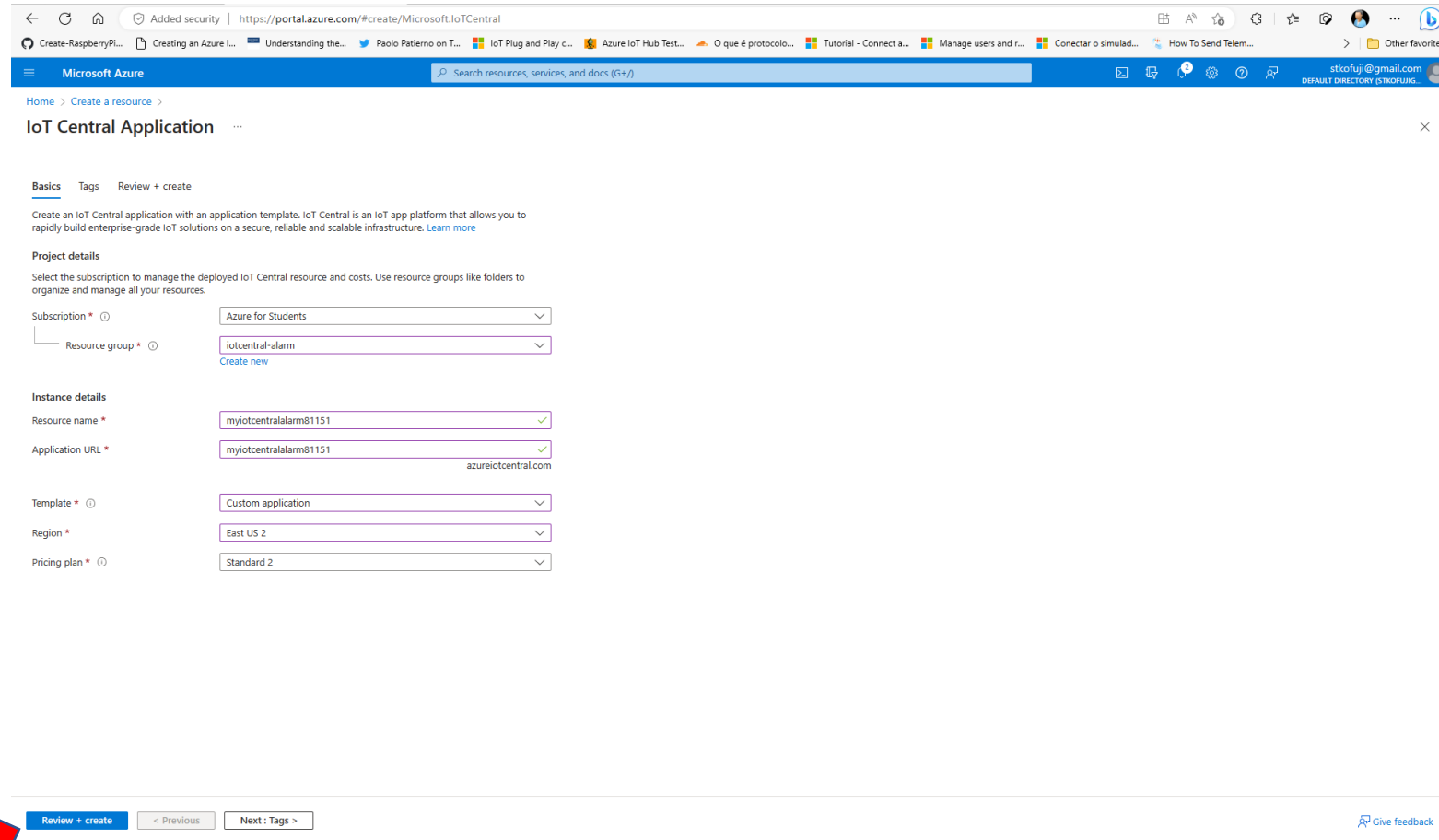
The screenshot shows the Microsoft Azure portal interface for creating a resource. The page is titled "Create a resource" and features a search bar at the top. Below the search bar, there are three main sections: "Recently created", "Popular Azure services", and "Popular Marketplace products".

The "Popular Azure services" section is highlighted with a red arrow pointing to the "IoT Central application" option. This option is listed with its icon, name, and links for "Create", "Docs", and "MS Learn".

The "Popular Marketplace products" section lists various products, including "Azure Blob Storage on IoT Edge", "Simulated Temperature Sensor", "Azure SQL Edge Developer", "Usage-based plan", "OPC Publisher", "IoT Edge Metrics Collector", "YOLOv3 gRPC-CPU Extension", "Free", "Small EJBCA SaaS Deployment with Azure KeyVault backed keys in a US region", and "Node-RED".

The left sidebar shows a list of categories, with "Internet of Things" selected. Other categories include "AI + Machine Learning", "Analytics", "Blockchain", "Computing", "Databases", "Developer Tools", "DevOps", "Identity", "Integration", "IT & Management Tools", "Media", "Migration", "Mixed Reality", "Monitoring & Diagnostics", "Networking", "Security", "Storage", and "Web".

Crie uma aplicação do IoT Central



Microsoft Azure | Search resources, services, and docs (G+)

Home > Create a resource >

IoT Central Application

Basics | Tags | Review + create

Create an IoT Central application with an application template. IoT Central is an IoT app platform that allows you to rapidly build enterprise-grade IoT solutions on a secure, reliable and scalable infrastructure. [Learn more](#)

Project details
Select the subscription to manage the deployed IoT Central resource and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *

Resource group * [Create new](#)

Instance details

Resource name *

Application URL * azureiotcentral.com

Template *

Region *

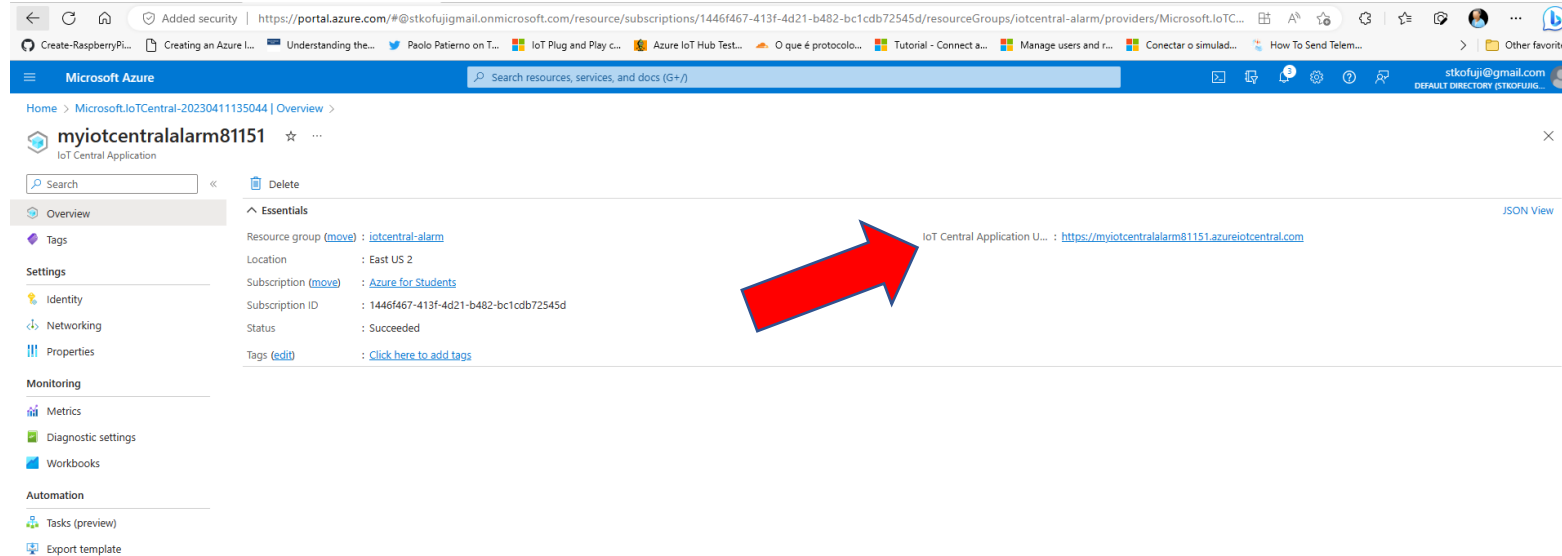
Pricing plan *

[Review + create](#) [< Previous](#) [Next: Tags >](#) [Give feedback](#)

Vá para o recurso criado

The screenshot displays the Microsoft Azure portal interface. At the top, the navigation bar shows the Microsoft Azure logo and a search bar. The main content area is titled "Microsoft.IoTCentral-20230411135044 | Overview". A notification banner at the top right states "Deployment succeeded" with details: "Deployment 'Microsoft.IoTCentral-20230411135044' to resource group 'iotcentral-alarm' was successful." Below the notification, the main heading reads "Your deployment is complete". To the right of this heading, deployment details are listed: "Deployment name: Microsoft.IoTCentral-20230411135044", "Subscription: Azure for Students", "Resource group: iotcentral-alarm", "Start time: 4/11/2023, 1:53:07 PM", and "Correlation ID: 651f15e9-f662-47a7-932d-7a4443680147". Under the "Next steps" section, a blue button labeled "Go to resource" is highlighted with a large red arrow. Other sections include "Deployment details", "Next steps", and "Give feedback". The right sidebar contains recommendations for "Cost Management", "Microsoft Defender for Cloud", "Free Microsoft tutorials", and "Work with an expert".

Vá para a página da aplicação do IoT Central



The screenshot shows the Microsoft Azure portal interface. The browser address bar displays the URL: <https://portal.azure.com/#@stkofujigmail.onmicrosoft.com/resource/subscriptions/1446f467-413f-4d21-b482-bc1cdb72545d/resourceGroups/iotcentral-alarm/providers/Microsoft.IoTCentral/iotcentralalarm81151>. The page title is "myiotcentralalarm81151" and it is identified as an "IoT Central Application".

The left sidebar contains navigation options: Overview (selected), Tags, Settings (Identity, Networking, Properties), Monitoring (Metrics, Diagnostic settings, Workbooks), and Automation (Tasks (preview), Export template).

The main content area shows the "Essentials" section with the following details:

- Resource group (move): [iotcentral-alarm](#)
- Location: East US 2
- Subscription (move): [Azure for Students](#)
- Subscription ID: 1446f467-413f-4d21-b482-bc1cdb72545d
- Status: Succeeded
- Tags (edit): [Click here to add tags](#)

A red arrow points to the link "IoT Central Application U... : <https://myiotcentralalarm81151.azureiotcentral.com>".

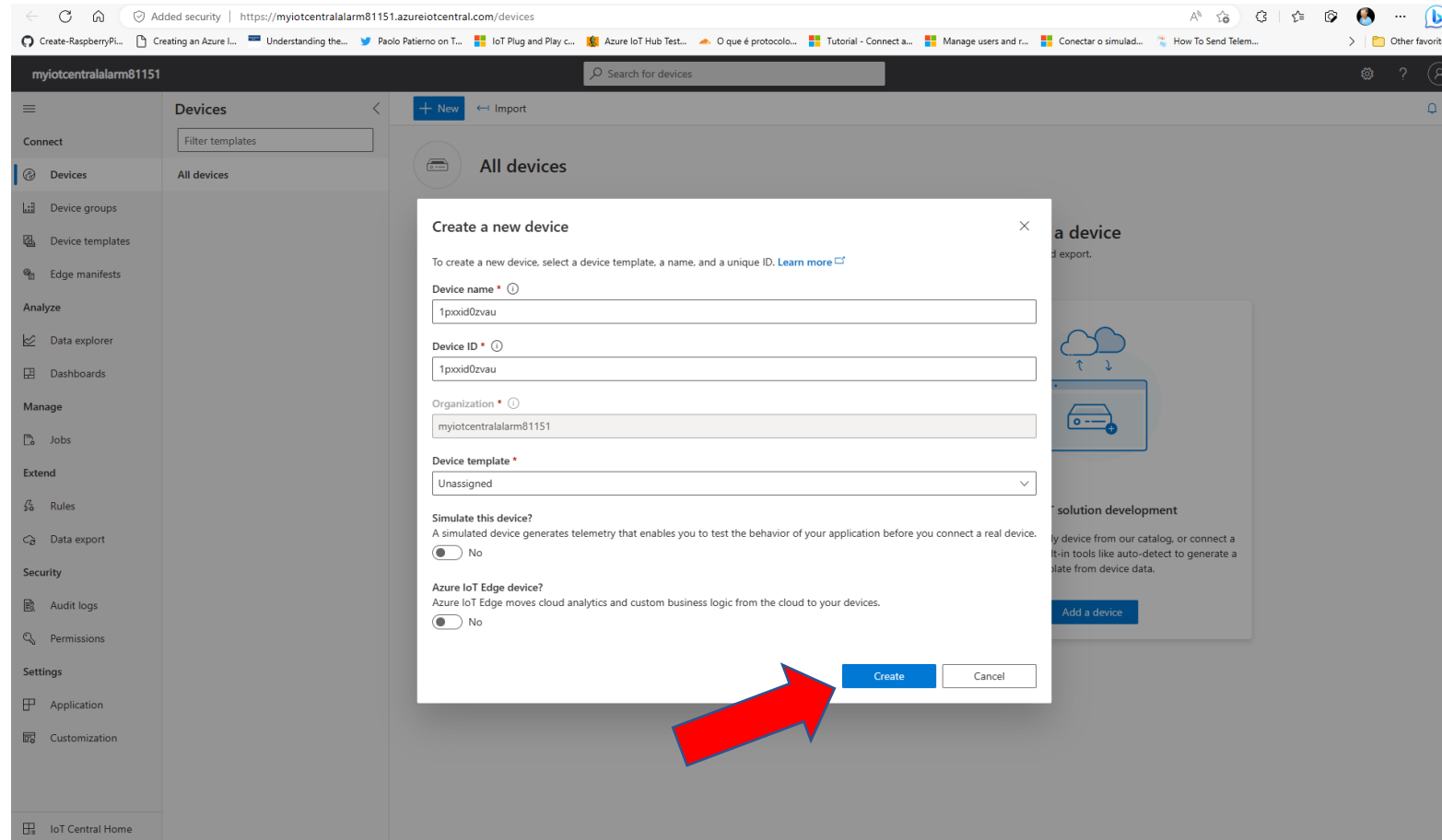
Vamos adicionar um dispositivo

The screenshot shows the Azure IoT Central interface for a device named 'myiotcentralalarm81151'. The main heading is 'All devices'. Below this, there is a section titled 'To get started with IoT Central, connect a device' with the subtext 'Devices will send data to IoT Central for you to view, analyze and export.' There are two main cards:

- Get up and running in 5 minutes:** This card includes the text 'New to IoT? Grab our mobile app to connect your phone. Then we'll help you try out a few key IoT Central features using live data.' and a button labeled 'Use phone as a device'.
- Start IoT solution development:** This card includes the text 'Choose an Azure-ready device from our catalog, or connect a custom device. Try built-in tools like auto-detect to generate a template from device data.' and a button labeled 'Add a device'.

A large red arrow points from the bottom center towards the 'Add a device' button.

Vamos criar um dispositivo

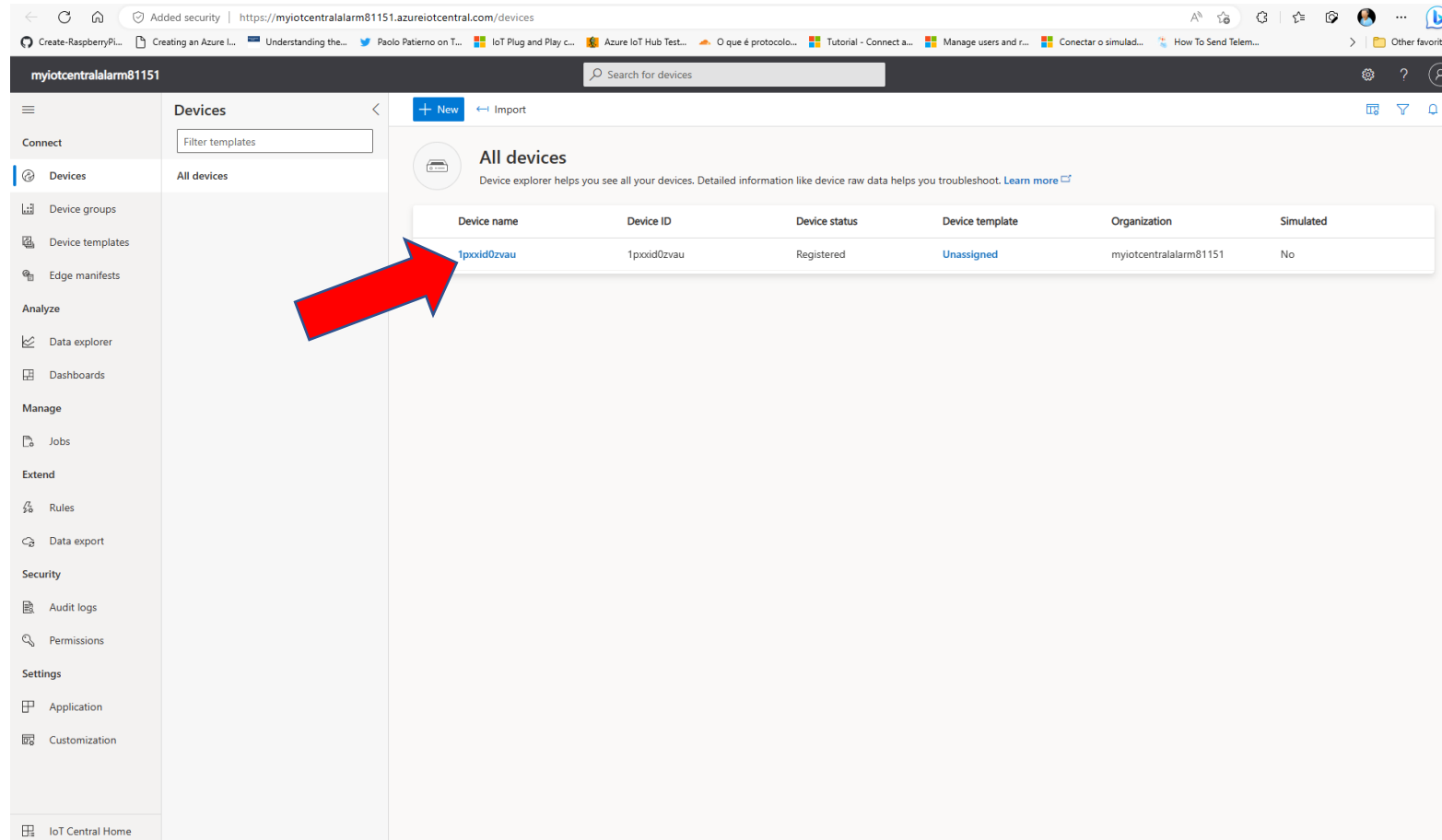


The screenshot shows the Azure IoT Central interface for a device named 'myiotcentralalarm81151'. A modal dialog titled 'Create a new device' is open, allowing the user to configure a new device. The dialog includes the following fields and options:

- Device name ***: Text input containing '1pxid0zvau'.
- Device ID ***: Text input containing '1pxid0zvau'.
- Organization ***: Dropdown menu showing 'myiotcentralalarm81151'.
- Device template ***: Dropdown menu showing 'Unassigned'.
- Simulate this device?**: Radio button selection with 'No' selected.
- Azure IoT Edge device?**: Radio button selection with 'No' selected.

At the bottom of the dialog are 'Create' and 'Cancel' buttons. A large red arrow points to the 'Create' button. The background shows the 'All devices' page with a search bar and a '+ New' button.

Vamos explorar o dispositivo criado



The screenshot shows the Azure IoT Central interface for a specific organization. The main content area displays a table of all devices. A red arrow points to the first device listed.

Device name	Device ID	Device status	Device template	Organization	Simulated
1pxoid0zvau	1pxoid0zvau	Registered	Unsigned	myiotcentralalarm81151	No

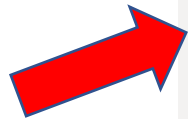
Vamos conectar o dispositivo (smartphone)

The screenshot displays the Azure IoT Central interface for a device named '1pxxid0zvau'. A modal dialog titled 'Device connection groups' is open, showing the following configuration:

- ID scope:** One009B307A
- Device ID:** 1pxxid0zvau
- Authentication type:** Shared access signature (SAS)
- Key:** QR code

The dialog includes instructions: "Scan the QR code from a supported mobile app, like [IoT Plug and Play](#), to quickly and securely connect your device to IoT Central." A red arrow points to the QR code. A 'Close' button is located at the bottom right of the dialog.

Vamos EDITAR o dashboard

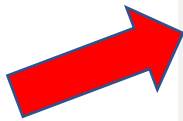


The screenshot displays the Azure IoT Central interface for a device named '1pxxid0zvau'. The left sidebar contains a navigation menu with categories: Connect, Devices, Analyze, Manage, Extend, Security, and Settings. The 'Dashboards' menu item is highlighted with a red arrow. The main content area shows the device's overview, including its status (Provisioned) and organization (myiotcentralalarm81151). Below this, there are several data panels: Battery Level (93), Altitude (No data found), Acceleration (Acceleration / X, Y, Z), Rotation (Rotation / X, Y, Z), Location (No data found), Pressure (Pressure), and Magnetic induction (Magnetic inducti...). The top navigation bar includes options like 'Connect', 'Manage template', and 'Manage device'. A search bar for devices is also present.

DASHBOARD

- CRIE UM DASHBOARD CONTENDO PELO MENOS 5 VARIÁVEIS DE TELEMETRIA

Vamos EDITAR REGRAS



myiotcentralalarm81151

Search for devices

IoT Hub and DPS are updating their TLS certificates with a new Microsoft Certificate Authority (CA) chained under a new CA root - DigiCert Global G2 Root. You will need to take action to ensure your devices can continue to connect. See [here](#) for details.

Connect Manage template Manage device

Devices > IoT Plug and Play mobile > 1pxxid0zvau

1pxxid0zvau
Last data received: 4/11/2023, 2:02:36 PM | Status: Provisioned | Organization: myiotcentralalarm81151

Device properties Get started **Overview** Commands Raw data Mapped aliases Files

Battery Level 93
now

Altitude
No data found
Check your device or network connection, and make sure you're part of the device's org.

Acceleration
Acceleration / X Acceleration / Y Acceleration / Z
01:33 PM 04/11/2023 02:04 PM 04/11/2023

Rotation
Rotation / X Rotation / Y Rotation / Z
01:33 PM 04/11/2023 02:04 PM 04/11/2023

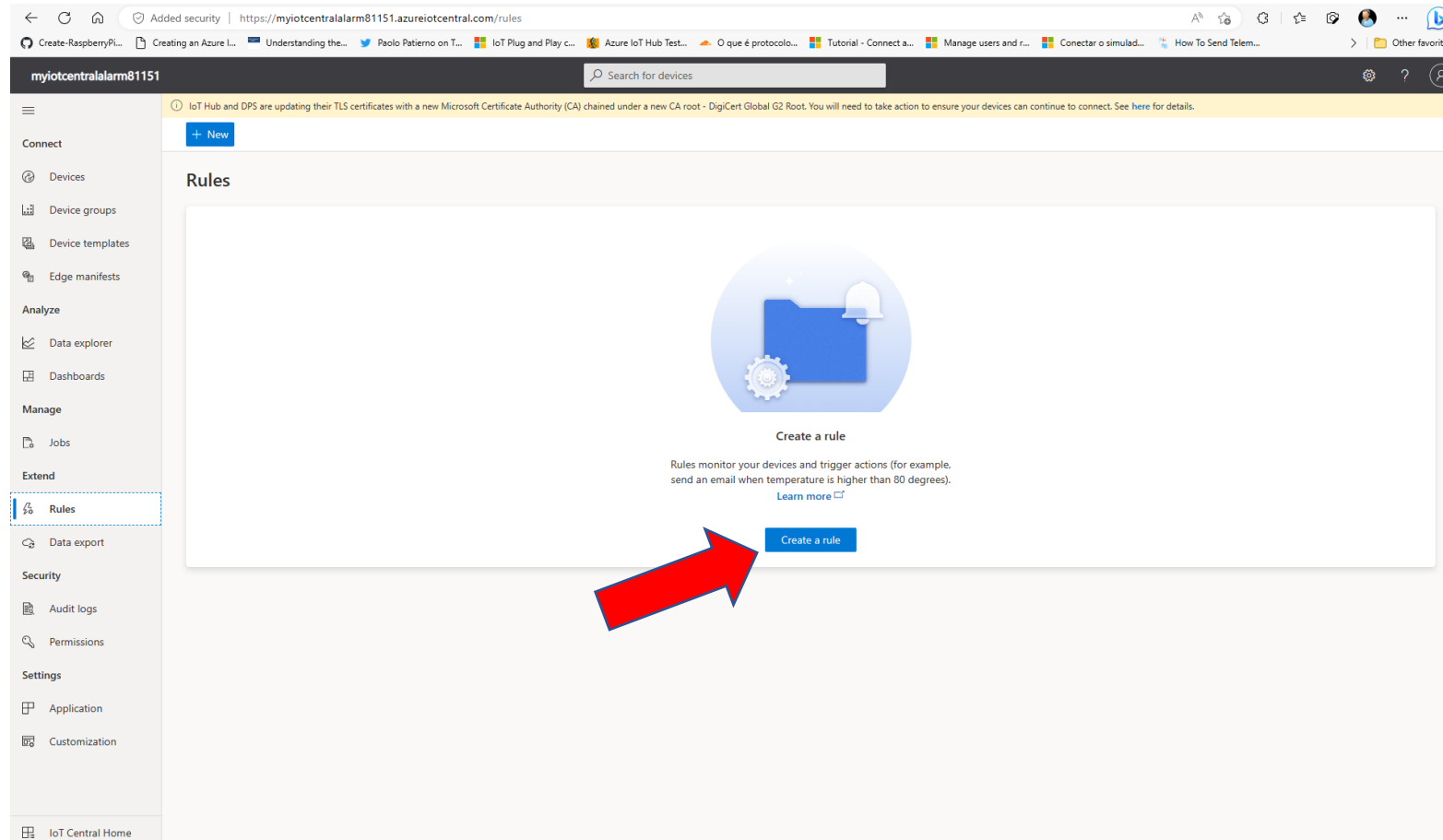
Location

Pressure
Pressure
01:33 PM 04/11/2023 02:04 PM 04/11/2023

Magnetic induction
Magnetic inducti... Magnetic inducti... Magnetic inducti...
01:33 PM 04/11/2023 02:04 PM 04/11/2023

Navigation sidebar:
Connect
Devices
Device groups
Device templates
Edge manifests
Analyze
Data explorer
Dashboards
Manage
Jobs
Extend
Rules
Data export
Security
Audit logs
Permissions
Settings
Application
Customization
IoT Central Home

Vamos criar algumas regras



The screenshot shows the Azure IoT Central web interface for a device named 'myiotcentralalarm81151'. The left sidebar contains a navigation menu with categories: Connect (Devices, Device groups, Device templates, Edge manifests), Analyze (Data explorer, Dashboards), Manage (Jobs), Extend (Rules, Data export), Security (Audit logs, Permissions), Settings (Application, Customization), and IoT Central Home. The 'Rules' item is highlighted with a dashed blue border. The main content area is titled 'Rules' and features a '+ New' button at the top left. Below this is a large graphic of a blue folder with a gear and a bell icon, with the text 'Create a rule' underneath. A descriptive paragraph states: 'Rules monitor your devices and trigger actions (for example, send an email when temperature is higher than 80 degrees).' followed by a 'Learn more' link. At the bottom of this graphic is a blue 'Create a rule' button. A large red arrow points from the bottom center towards this button. A yellow warning banner at the top of the page reads: 'IoT Hub and DPS are updating their TLS certificates with a new Microsoft Certificate Authority (CA) chained under a new CA root - DigiCert Global G2 Root. You will need to take action to ensure your devices can continue to connect. See here for details.'

Edite uma regra para detecção de alerta para aceleração X

The screenshot displays the Azure IoT Central web interface for creating a new rule. A red arrow points to the 'Rules' menu item in the left sidebar. The main content area is titled 'Rules > Create new rule' and includes the following sections:

- Enter a rule name:** A text input field.
- Enabled:** A toggle switch that is currently turned on.
- Target devices:** A section for selecting the device template. The 'Device template' dropdown is set to 'IoT Plug and Play mobile'. There is a '+ Filter' button below.
- Conditions:** A section for defining when the rule is triggered. The 'Trigger the rule if' dropdown is set to 'any of the conditions are true'. The 'Time aggregation' is set to 'Off'. A condition is defined with 'Telemetry' set to 'Acceleration / X', the 'Operator' set to 'is greater than', and the 'Value' set to '2'.
- Actions:** A section for choosing what action the rule should take. An action named 'Email: Email 1' is selected. The configuration for this action includes:
 - Display name: Email 1
 - To: stkoju@gmail.com
 - Note: atencao- queda do smartphone

At the bottom right, a preview of the email notification is shown, including the Microsoft logo, 'Azure IoT Central', and the message: '"" triggered on "[device name]" at April 11, 2023 17:06 UTC'. Below the preview, the 'Measurements' section shows 'IoT Plug and Play mobile / Sensors / Acceleration / X: [value]'.

TAREFA

- ESCREVA REGRAS PARA DETECTAR A QUEDA DO SMARTPHONE!
- VERIFIQUE O FUNCIONAMENTO

DÚVIDAS?

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