



BERUFLICHE SCHULE ITECH

Elbinsel Wilhelmsburg

IoT Fundamentals: IoT Security GAME

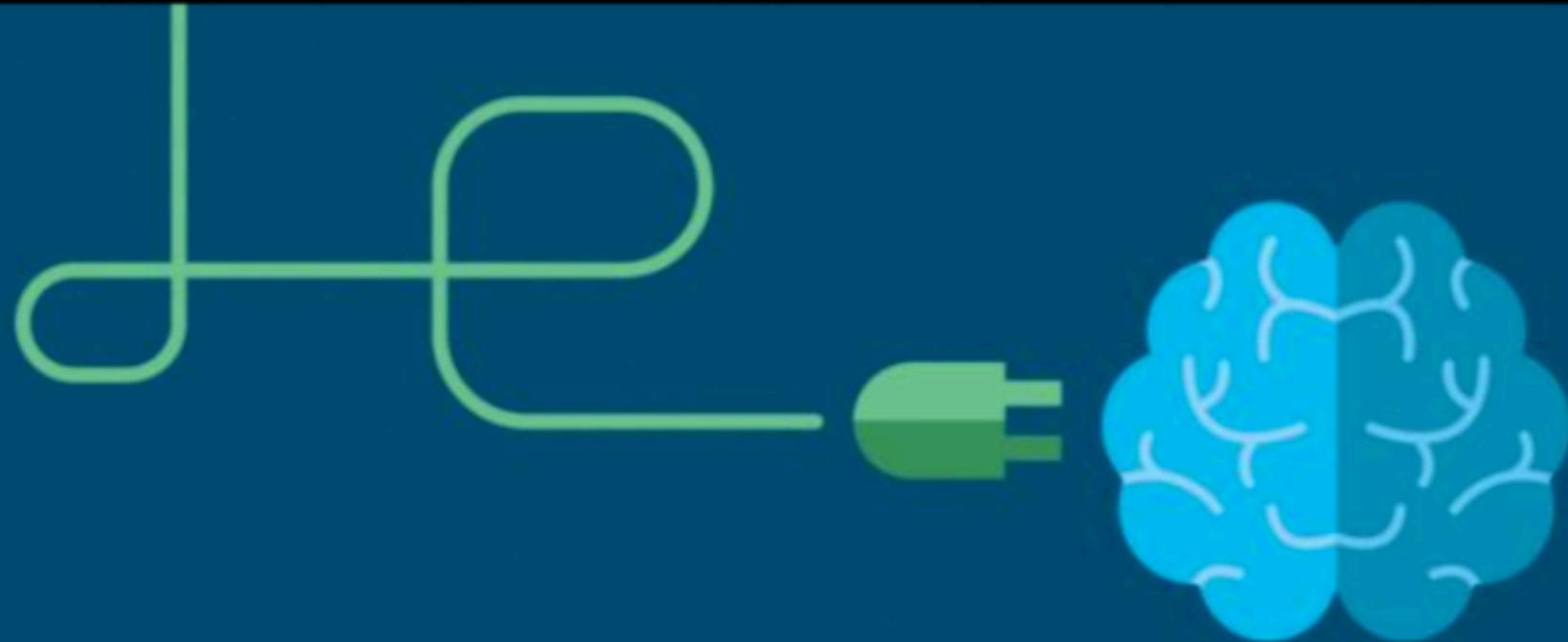
zzt. im Beta-Stadium – Special Thanks to **Jozef Janitor** for the Beta-Access (*s. vorletzte Folie*)

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IoT Security Game BETA 3

Play a game to reinforce your cybersecurity skills

Overview

Jozef Janitor (jjanitor@cisco.com)
Product Strategy, Networking Academy
2019/03/11



What if?



What if we could turn the whole learning experience into a game?
Learning new skills to solve a puzzle!

What if?



What is the IoT Security Game?

Team players and Isolation

- CTF Multiplayer Isolated Network Classroom Game
- Players are Formed to Teams
 - Can be around the same desk
 - Can be remote and use the built in Chat to communicate
 - 2-3 players per team
- Jeopardy type of game
 - Teams are isolated from each other using VLANs
 - No “attack-defence” in the current release

Where are the Flags?



- **3 Levels - Rings**

- Ring 0 – Start
- Ring 1 – Exploit the Physical Vulnerabilities
- Ring 2 – Exploit the Network Vulnerabilities
- Ring 3 – Exploit the Application Vulnerabilities

- **10 missions**

- Challenging mission with a goal to get to a flag

Missions

1. JTAG
2. Default credentials
3. Privilege escalation
4. Weak passwords
5. Extract the Firmware
6. Port scan
7. Remote access
8. Unencrypted protocols
9. Play with the http query parameters.
10. Insecure web APIs

Game Goal: Catch The Flag



- Flag = secret string
 - **CTF**{JOZEF}
 - \$6\$**CTFPASS**\$ddxP.6vrNQT6CegRUVosBNssnG.o9pTO9}
 - URL
 - **CTF**{compromised}
- Report the flag to the Game Server
 - Proof of work ;-)

Got the Flag, now what?

- **Answer the Quiz questions**

- Recommend Threat Mitigation Strategies

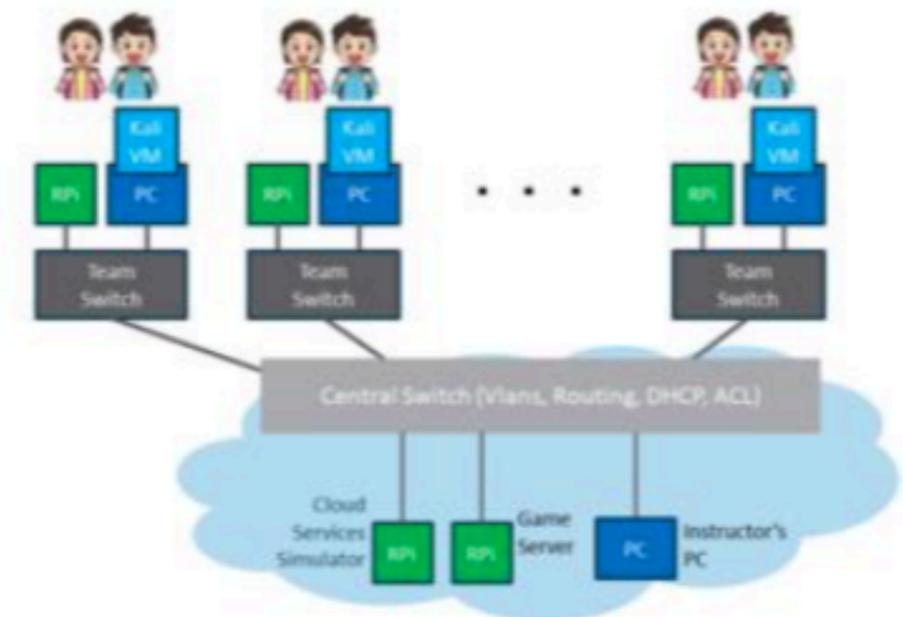
- **Get your score points:**

- $\text{score} = \langle \text{max points} \rangle * \langle \text{completion order factor} \rangle * (1 + \langle \text{correct quiz questions} \rangle / \langle \text{total quiz questions} \rangle) / 2$
- Completion order factor:
 - First team to complete this mission: 100%
 - Second team to complete this mission: 75%
 - Third team to complete this mission: 50%
 - All other teams: 30%

Ready to Play?

How to play the game? [instructor's view]

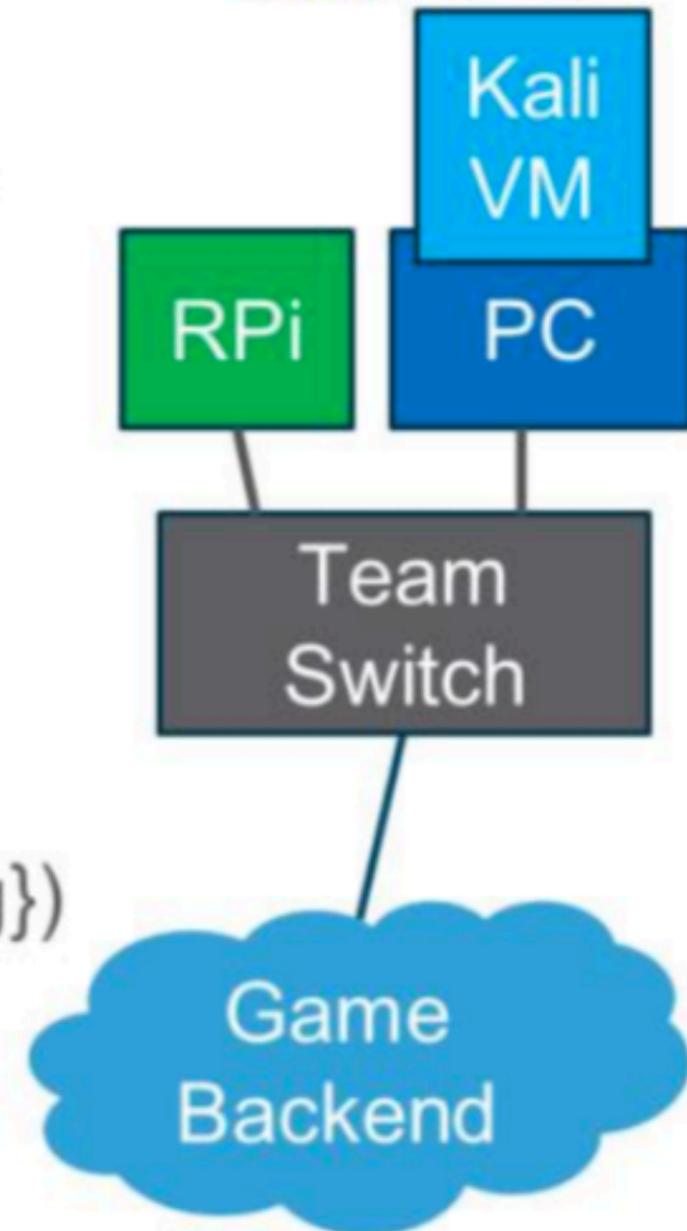
1. Setup the game topology
2. Connect your PC to the game topology
 - Connected to the ports assigned for the instructor's PC
3. Open a web browser and go to <http://gc.security.game>
4. Wait for the students to join the game on their PCs
5. Create the Teams and assign Members
6. Start the game
7. Follow the scoreboard
8. Announce the winners!



How to play the game? [student's view]



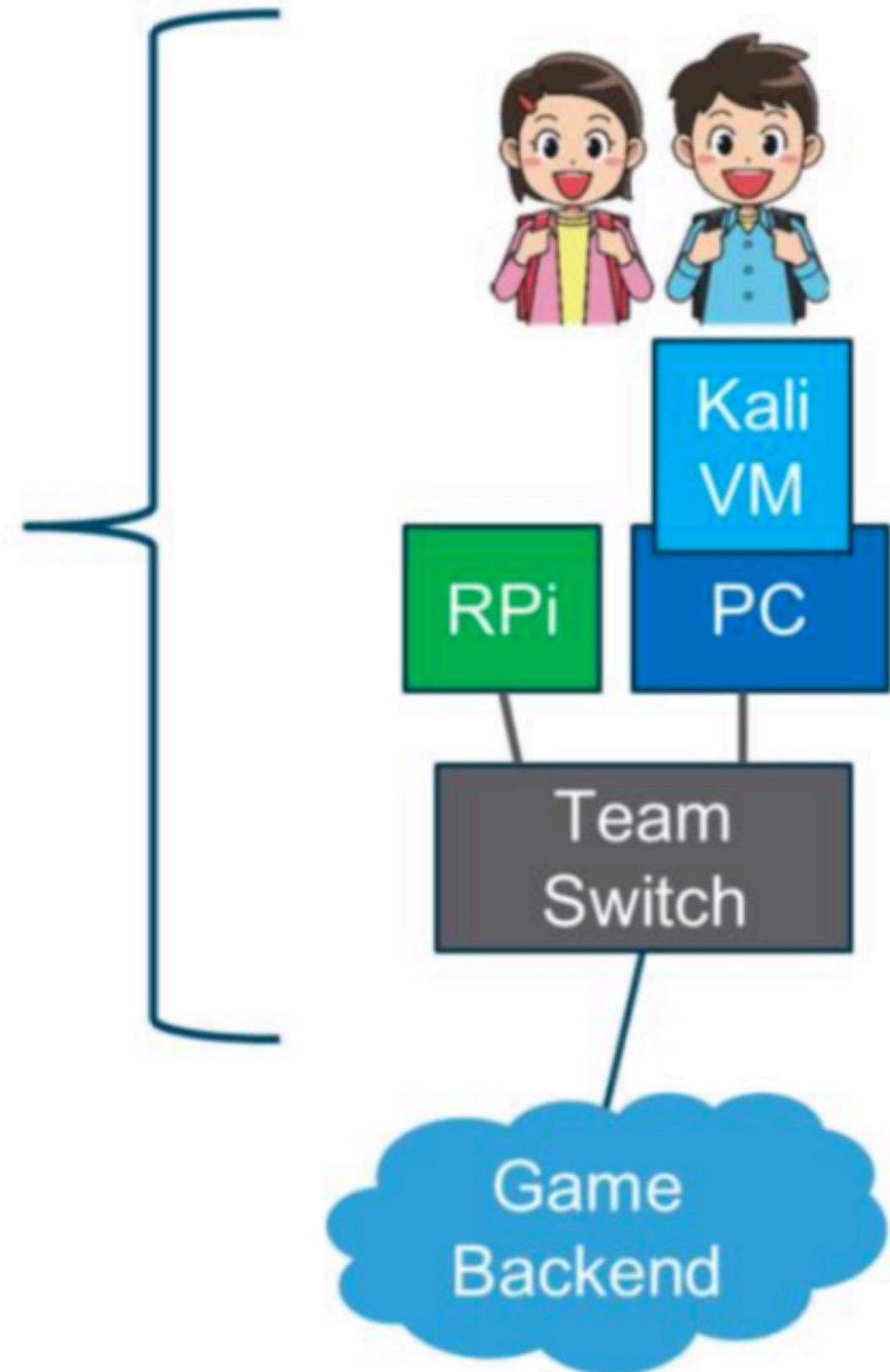
1. **Connect your PC to the game topology**
 - Connect to the small “5 port” Team Switch on your desk
2. Open a web browser and go to **<http://gc.security.game>**
3. Login with your name
4. Wait for the instructor to start the game
5. Strategize how to work in a team
6. Chose the mission you want to work on
7. Catch the flag – record the flag! (usually CTF{something})
8. Play! Solve the missions! Win!



Architecture

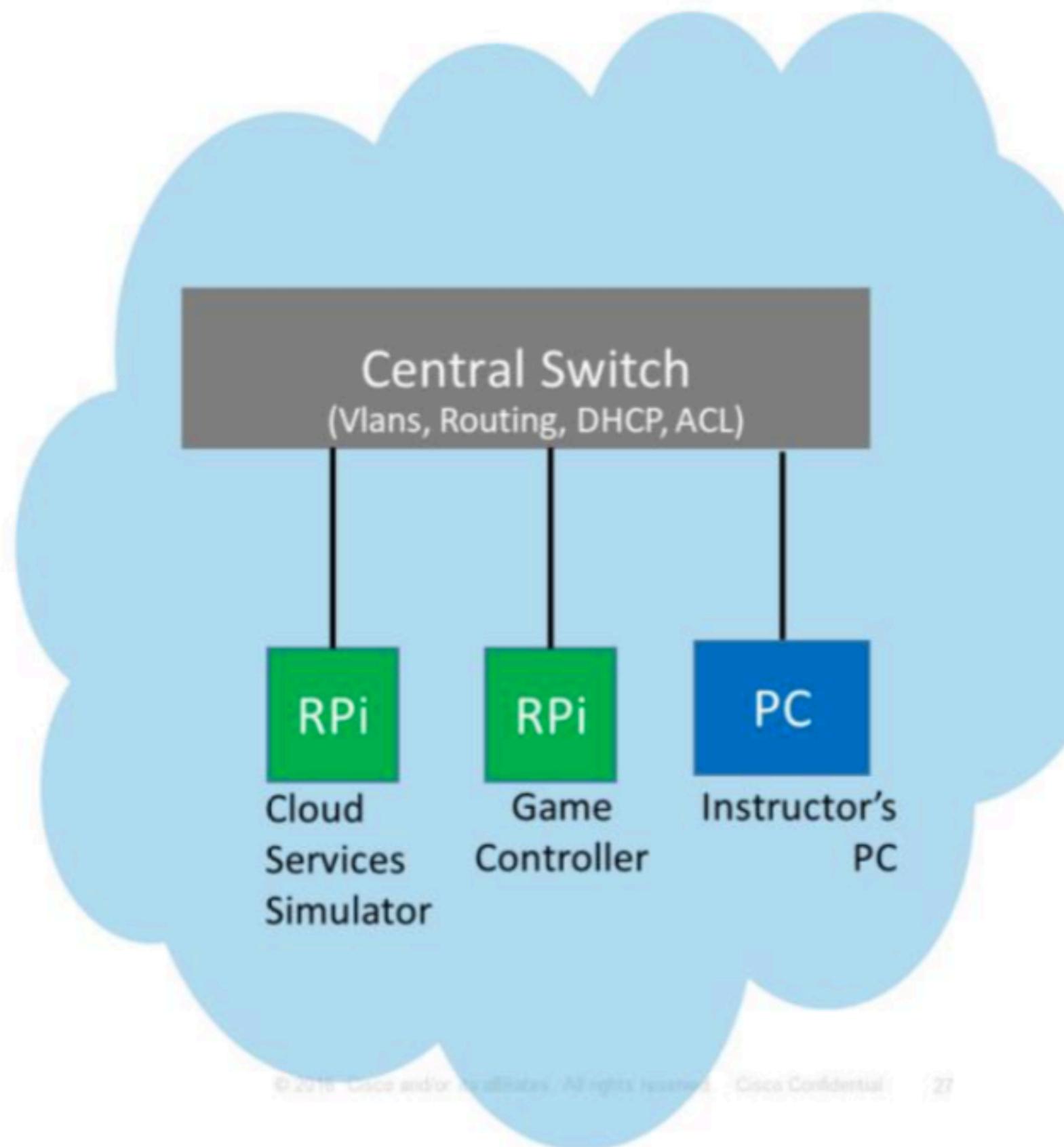
Architecture

- **Team Pod:**
 - Raspberry Pi
 - Proxy to a real world IoT Device
 - Kali Linux VM
 - Real world vulnerability assessing tool
 - PC
 - To host the VM
 - “5” port Team Switch
 - To create a small attacker “LAN”

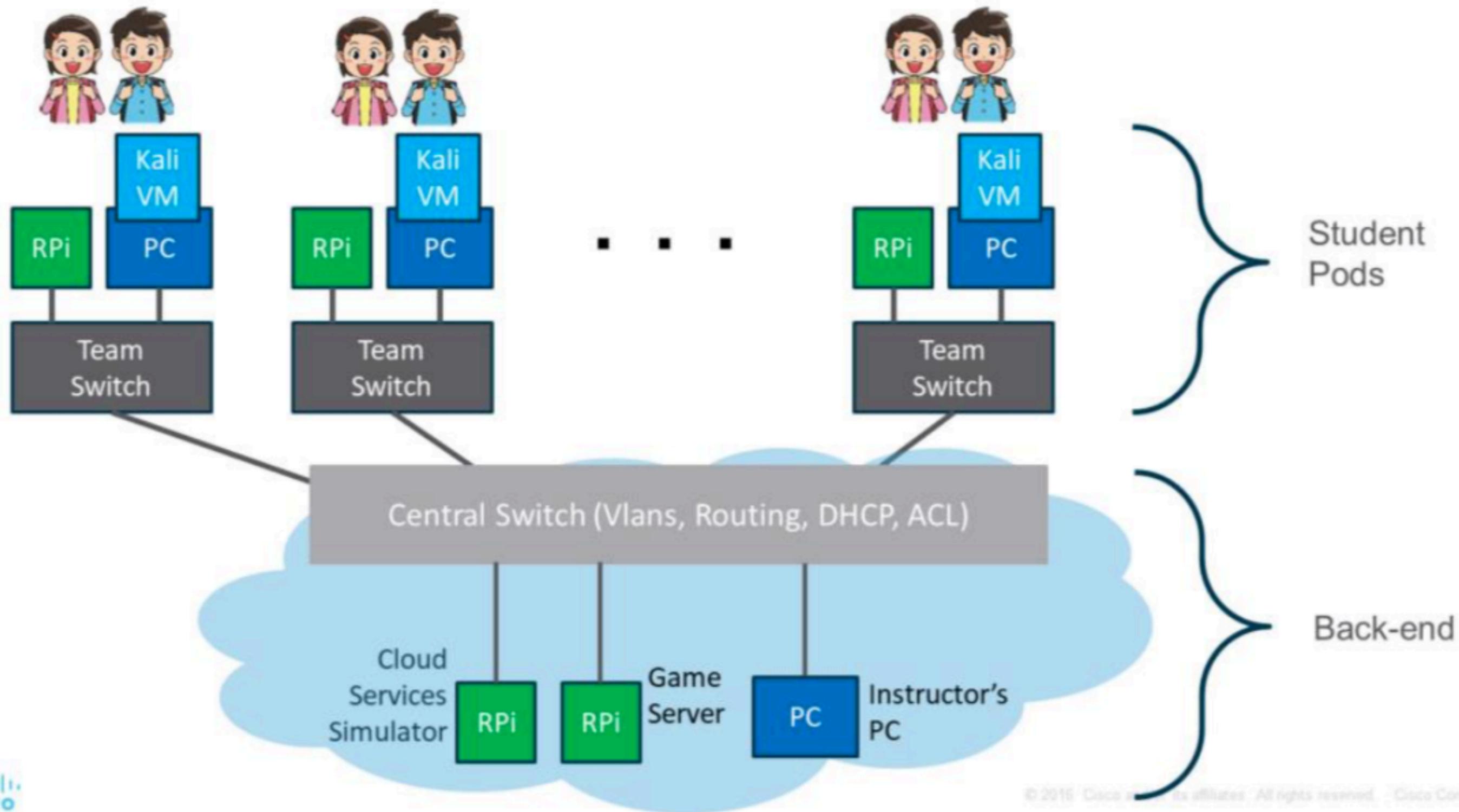


Architecture

- **Backend:**
 - Central Switch
 - VLAN based segmentation
 - L3 switching, DHCP, ACL, etc.
 - Game Controller Raspberry Pi
 - Game "Controller"
 - Cloud Services Simulator
 - Proxy to a real world Cloud backend
 - Instructor's PC
 - Monitoring the game
 - Creating and managing teams



Architecture



Demo



Wie komme ich an das Spiel?

- Das IoT-Security-Game liegt momentan nur in der Beta3-Version vor.
- Laut Jozef Janitor (einem der cleveren Köpfe hinter den IoT-Fundamentals-Kursen) ist eine Veröffentlichung für alle Instruktoeren in den nächsten 6 Monaten geplant.
- Bis zur offiziellen Veröffentlichung können sich interessierte Instruktor*innen für die Beta3-Version registrieren! Wenn **DU** daran Interesse hast, schreibe mir eine E-Mail und ich schicke Dir einen Registrierungs-Link!

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**Vielen Dank
und
weiterhin einen spannenden Akademietag!**