Examining Leading Pakistani Mobile Apps

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Free and Open Communications on the Internet, February 2025

Outline

Outline

Motivation: Local Situation

Anniversary of ex-Pakistan PM's arrest: Imran khan's supporters protest one year on

UPDATED February 08, 2025

By RFE/RL's Radio Mashaal

Pakistan's Opposition Takes To Streets On Anniversary Of Disputed Elections

Supporters of jailed former Pakistani Prime Minister Imran Khan attend a rally in Swabi (file photo)

SWABI, Pakistan -- Pakistani opposition parties, including the Tehreek-e-Insaf (PTI) party of imprisoned former Prime Minister Imran Khan, staged demonstrations on February 8 to mark the first anniversary of the country's general elections, which triggered widespread allegations of vote-rigging.

Motivation: Local Situation

May 20, 2023 9:00AM EDT

Pakistan: Mass Arrests Target Political Opposition

Uphold Rights While Prosecuting Khan Protest Violence

Police detain a supporter of Pakistan's former Prime Minister Imran Khan during clashes, in Islamabad, Pakistan, May 12, 2023. © 2023 W.K. Yousafzai/AP Photo

(New York) – Pakistani police have carried out mass arrests and detained more than 4,000 people in

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Motivation: Local Situation

MEDIA | PAKISTAN

Press Freedom Day: Why are journalists fleeing Pakistan?

Anas Ahmed
05/03/2024

Acute security risks, intimidation, online abuse and severe financial woes are forcing many media professionals to leave the country.

Motivation: Local Situation

WORLD NEWS 2 JANUARY 2025

Pakistan installs China-style firewall, arrests social media users

by PAUL ANTONOPOULOS

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Research Question

- Is it possible to use leading Pakistani Android apps for spying, monitoring, and targeting vulnerable Pakistani citizens?
- If so, who could potentially misuse these apps, and by what methods could they do so?

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App Selection

- Criteria: (i) Popularity, (ii) Necessity, (iii) Timeliness, (iv) Personal Data Collection, (v) Local Situation.
- Government Apps: (i) Pak Identity, (ii) Pakistan Citizen Portal, (iii) Qeemat Punjab.
- Telco Apps: (i) SIMOSA (Previously Jazz World), (ii) My Zong, (iii) My Telenor, (iv) UPTCL.

Government Apps

	App Title	Use	Popularity
1.	Pak Identity	Request, Modify, and Update National Identity Documents.	Downloads: 1M+
2.	Pakistan Citizen Portal	Grievance Redressal System.	Downloads: 5M+
3.	Qeemat Punjab	Get awareness regarding daily prices of agriproducts.	Downloads: 1M+

Telco Apps



	App Title	Use	Popularity
4.	SIMOSA	Manage your Jazz mobile plan.	Subscribers: $\approx$ 71 M, Downoloads: 50M+
5.	My Zong	Manage your Zong mobile plan.	Subscribers: $\approx$ 49 M, Downloads: 50M+
6.	My Telenor	Manage your Telenor mobile plan.	Subscribers: $\approx$ 44 M, Downloads: 50M+
7.	UPTCL	Manage your UPTCL mobile plan.	Subscribers: $\approx$ 26 M, Downloads: 10M+

Outline

Attacker Types

- State Attacker: Actors within local police, district police, and specialized units such as the Federal Intelligence Agency (FIA) and similar organizations.
- Private Attacker: Individuals associated with criminal organizations, drug cartels, extremist groups, and perpetrators of domestic abuse.
- Hybrid Attacker: Corrupt individuals within government organizations and those who can be influenced or coerced by corrupt actors.

Attacker Capabilities

- Physical Device Compromise. All three attacker types can compromise the physical device through:
  - Consfiscation.
  - Stealth.
  - Shared device.
  - Usurpation.
- In-path Network Position. An in-path network position with access to the server's private key allows attackers to:
  - View data in plaintext.
  - Monitor at-risk users' activities.
  - Extract sensitive information, such as emails and passwords.
  - Intercept and modify data in real time.
  - Fabricate evidence and frame the user.

Attacker Type: State Attacker

- Can have access to the server private key.
- Can confiscate user device.
- Can do in-path network manipulation.
- Can forcefully retrieve user credentials from the server.

Attacker Type: Private Attacker

- Can steal user device.
- Can do in-path network manipulation (if private attacker controls local network infrastructure—such as a home router).

Attacker Type: Hybrid Attacker

- Can have access to the server private key.
- Can confiscate user device.
- Can do in-path network manipulation.
- Can forcefully retrieve user credentials from the server.

Outline

Victim Types

- At-Risk Members of the Pakistani Media.
- Victims of Domestic Abuse-Passion Offender.
- Protestors, Activists, and Human Rights Defenders.

Outline

Methodology: Threat Classification

- Unnecessary Disclosure.
  - Excessive PII collection.
  - Exposed PII via their storage in plaintext in the Android File System.
- Login Weaknesses.
  - Missing Password.
  - Missing Login Detection.
- Network Security Threats.
  - Missing TLS.
  - Possibility of Eavesdrop and Modify.

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Results: Root Detection and SSL Pinning Capabilities

	App Title	Root Detection	SSL Pinning
1.	Pak Identity	×	✓
2.	Pakistan Citizen Portal	×	
3.	Qeemat Punjab	×	✓
4.	SIMOSA	×	✓
5.	My Zong	×	✓
6.	My Telenor	×	✓
7.	UPTCL	✓	✓

Results: Embedded Certificates

	App Title	Embedded Certs (directory inside app package)
1.	Pak Identity	—
2.	Pakistan Citizen Portal	res/raw/pmdu_gov _pk.crt
3.	Qeemat Punjab	—
4.	SIMOSA	assets/jazz_cert.crt, assets/new_cert.der
5.	My Zong	assets/golootlo_key_prod.pem, assets/zong-staging-public-key.pem
6.	My Telenor	assets/cbg_root. cer, res/GX.pem
7.	UPTCL	—

Results: PII Stored by Apps.

Keys: D → Days, Hrs → Hours.

	App Title	Call History (30D,14D,7D,24Hrs)	SMS History (30D,14D,7D,24Hrs)
1.	Pak Identity	×	×
2.	Pakistan Citizen Portal	×	×
3.	Qeemat Punjab	×	×
4.	SIMOSA	✓, ✓, ✓, ✓	✓, ✓, ✓, ✓
5.	My Zong	×, ×, ✓, ✓	×, ×, ✓, ✓
6.	My Telenor	×, ×, ✓, ✓	×, ×, ✓, ✓
7.	UPTCL	×, ✓, ✓, ✓	×, ✓, ✓, ✓

Results: PII Stored by Apps.

		Tax Certificate	Location Coordinates
1.	Pak Identity	×	Required.
2.	Pakistan Citizen Portal	×	Required.
3.	Qeemat Punjab	×	Required.
4.	SIMOSA	✓	Optional.
5.	My Zong	✓	Optional.
6.	My Telenor	✓	Optional.
7.	UPTCL	✓	Optional.

Results: Tax Certificate

CERTIFICATE OF COLLECTION OR DEDUCTION OF TAX ISSUED UNDER SECTION 164 READ WITH RULES 42 OF THE INCOME TAX ORDINANCE,2001

S.No.: 000000007921164 Original Date of issue: 21-May-2024

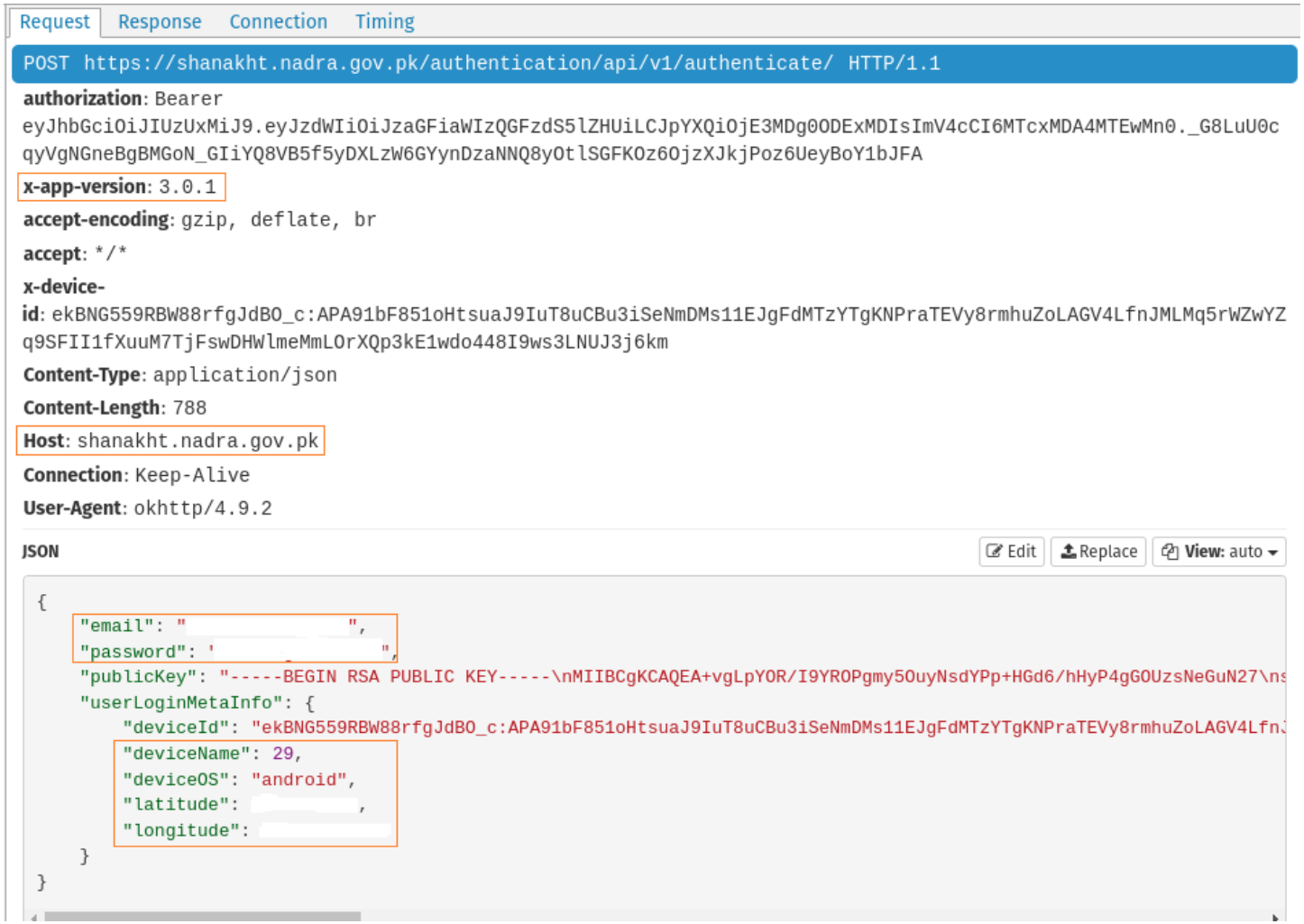
Certified that a sum of Rupees 1040.84/-(one thousand and forty point eight four Rupees) on account of income tax has been collected from:

[redacted], Username

Present address [redacted] **GPO Region PN Country Pakistan**

National Tax Number:	
NIC/CNIC No.:	[redacted]
for Mobile Number:	92321[redacted]
during the period:	Fiscal Year 2021-2022
under section:	236
on account of:	Telephone usage
on the value/amount of:	**Rupees** 8929.03/-
	Rupees eight thousand, nine hundred and twenty-nine point zero

Results: Transmission of Location Coordinates



Results: Unnecessary Disclosure

♦ → State Actor, ▲ → Private Actor, ■ → Hybrid Actor

	App Title	Excessive PII	Exposed PII
1.	Pak Identity	♦ ▲ ■	♦ ▲ ■
2.	Pakistan Citizen Portal	♦ ▲ ■	♦ ▲ ■
3.	Qeemat Punjab	♦ ▲ ■	♦ ▲ ■
4.	SIMOSA	×	♦ ▲ ■
5.	My Zong	×	♦ ▲ ■
6.	My Telenor	×	♦ ▲ ■
7.	UPTCL	×	×

Results: Unnecessary Disclosure

App Title	PII	Storage Location
Pak Identity	Full Name, Email ID, Password, Mobile Number, Citizen ID, Location Coordinates	cd/ata/data/pk.gov .nadra.pakid/databases/ RKStorage, cd/data/data/ pk.gov.nadra.pakid/databases /RKStorage-journal

(Details are in the paper.)

Results: Login Weaknesses

♦ → State Actor, ▲ → Private Actor, ■ → Hybrid Actor

	App Title	Missing Password	Missing Login Detection
1.	Pak Identity	×	♦ ▲ ■
2.	Pakistan Citizen Portal	×	♦ ▲ ■
3.	Qeemat Punjab	×	♦ ▲ ■
4.	SIMOSA	♦ ▲ ■	♦ ▲ ■
5.	My Zong	♦ ▲ ■	♦ ▲ ■
6.	My Telenor	♦ ▲ ■	♦ ▲ ■
7.	UPTCL	♦ ▲ ■	♦ ▲ ■

Results: Network Security Threats

♦ → State Actor, ▲ → Private Actor, ■ → Hybrid Actor

♦̆ ▲̆ ■̆ → Respective Attackers can Eavesdrop.

	App Title	Missing TLS	Traffic Interception & Manipulation
1.	Pak Identity	×	♦ ▲ ■
2.	Pakistan Citizen Portal	×	♦ ▲ ■
3.	Qeemat Punjab	×	♦ ▲ ■
4.	SIMOSA	×	|
5.	My Zong	×	♦̆ ▲̆ ■̆
6.	My Telenor	×	♦̆ ▲̆ ■̆
7.	UPTCL	×	|

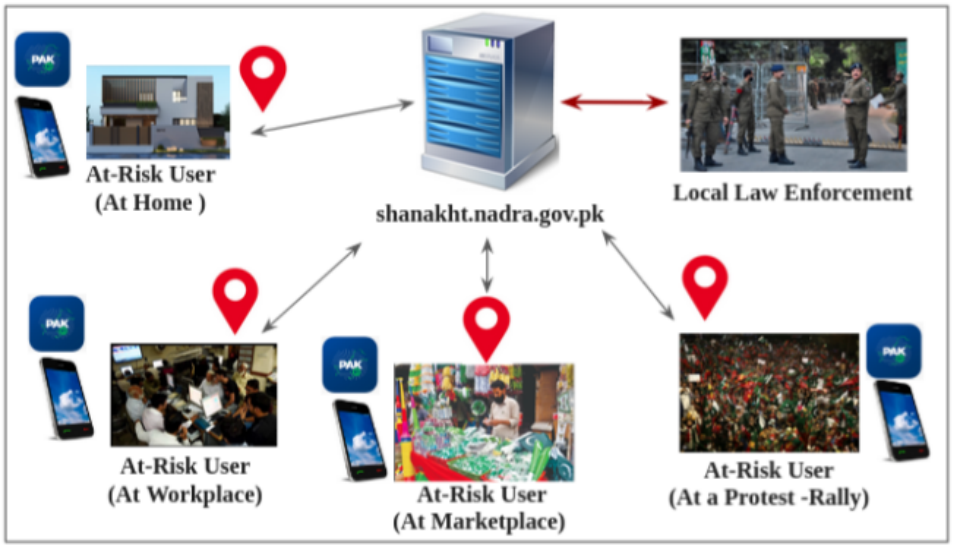
Outline

Exploitation: Exposed PII via Government Apps

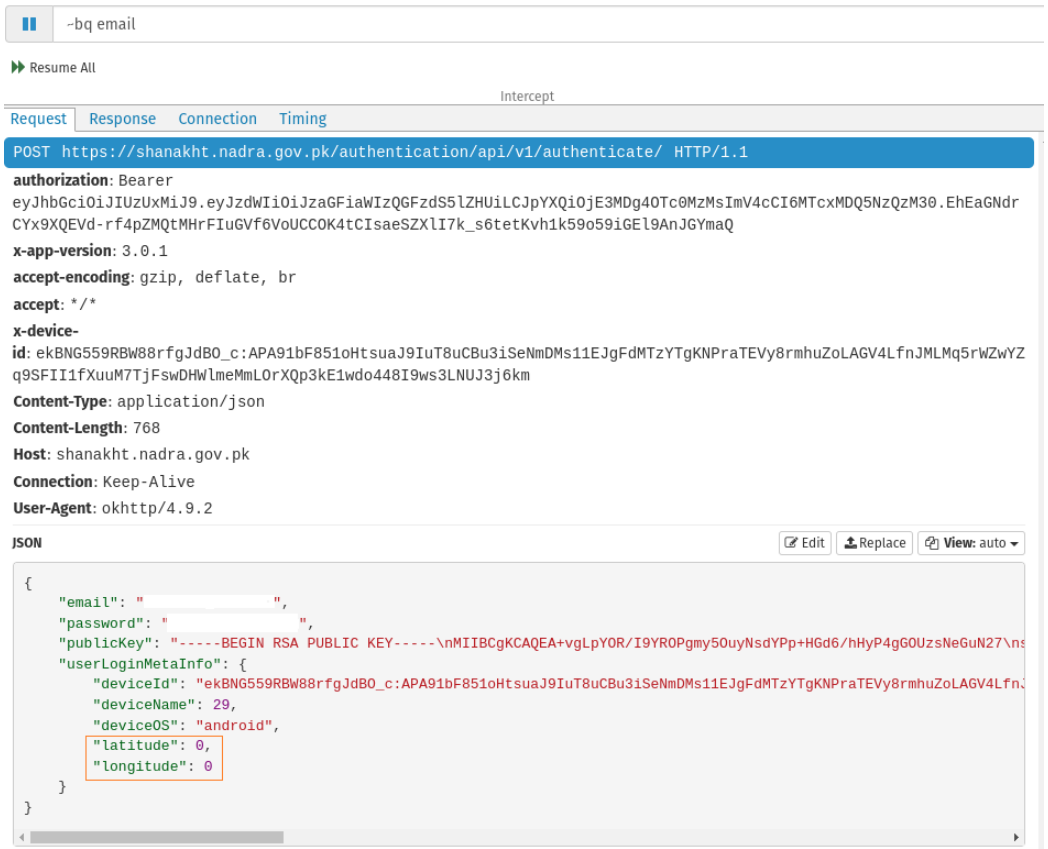
1. An at-risk user installs and uses the government apps on their phone.
2. An attacker confiscates or steals user device.
3. The attacker gains root access to the device and retrieves sensitive personal information (PII).

Exploitation: Exposed PII via Government Apps

Real-time geo-location tracking.



Exploitation: Network Security Threats via Government Apps (Planting Fake Location Coordinates)



Exploitation: Exposed PII via Telco Apps

1. An at-risk user's device is confiscated or stolen.
2. The attacker, having knowledge of an at-risk user's mobile number installs the app and retrieves PII.

Outline

Disclosure

	App Title	Email/Complaint Date
1.	Pak Identity	Mar 14, 2024; Apr 13, 2024
2.	Pakistan Citizen Portal	Mar 14, 2024; Apr 09, 2024
3.	Qeemat Punjab	Mar 14, 2024; Apr 13, 2024
4.	SIMOSA	June 24, 2024
5.	My Zong	Nov 03, 2024
6.	My Telenor	Nov 04, 2024
7.	UPTCL	July 30, 2024

Outline

Conclusion

- There are significant security and privacy issues with the leading Pakistani Android apps.
- Users must exercise caution when using the app.

Outline

Thank you!

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