QARK

Who are we?

Penetration Testers at LinkedIn

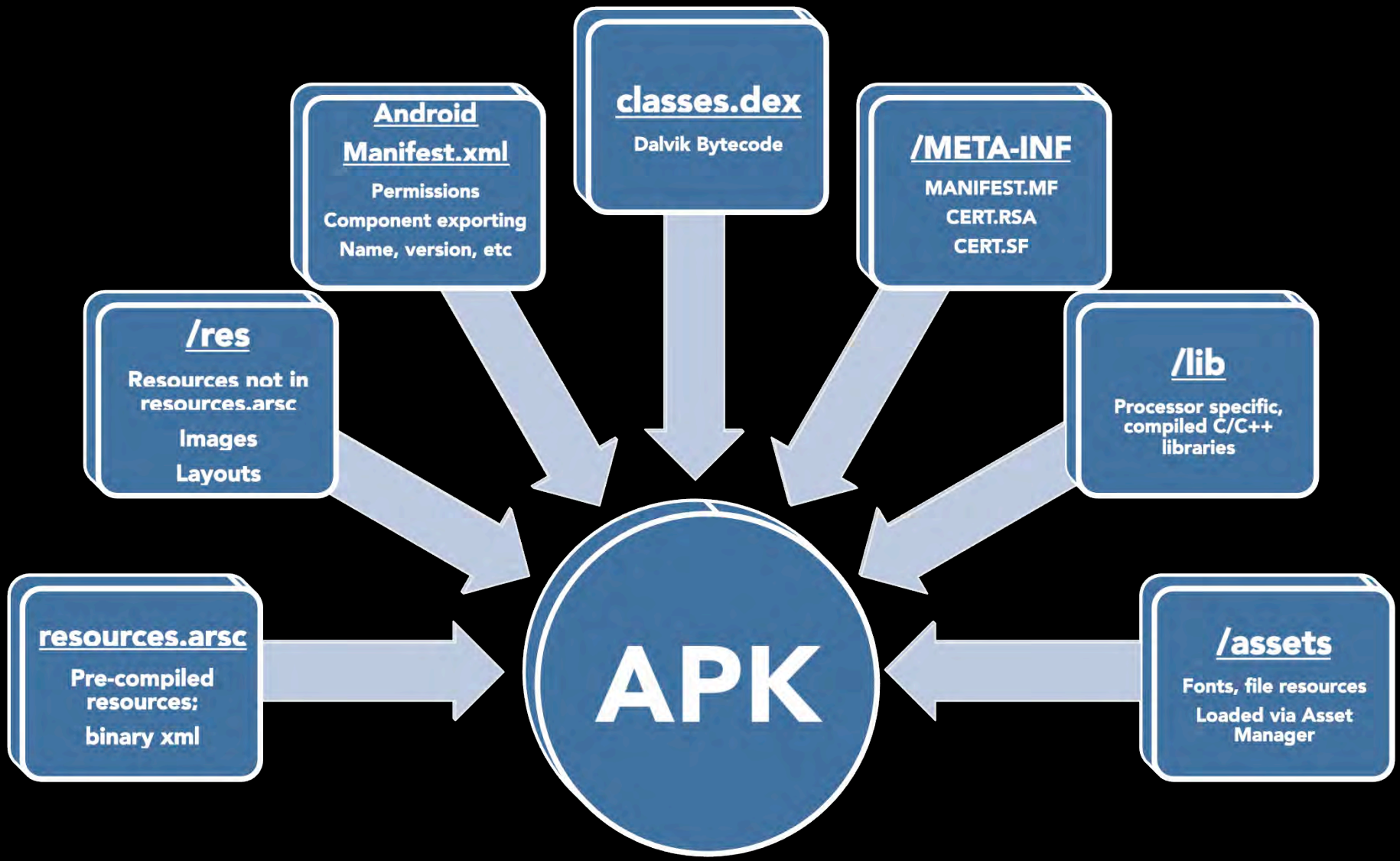
Tony Trummer

- Staff Information Security Engineer

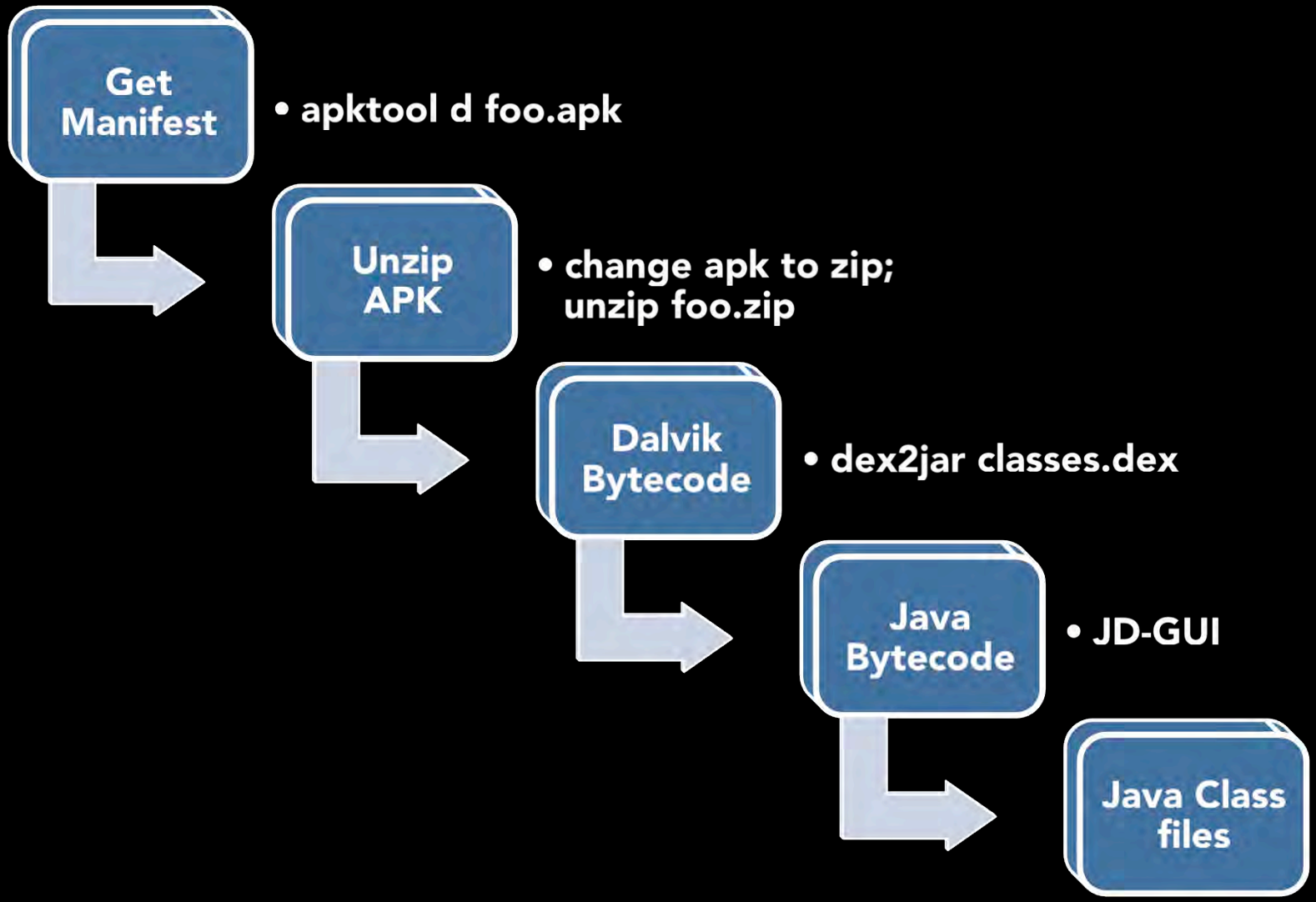
Tushar Dalvi

- Senior Information Security Engineer

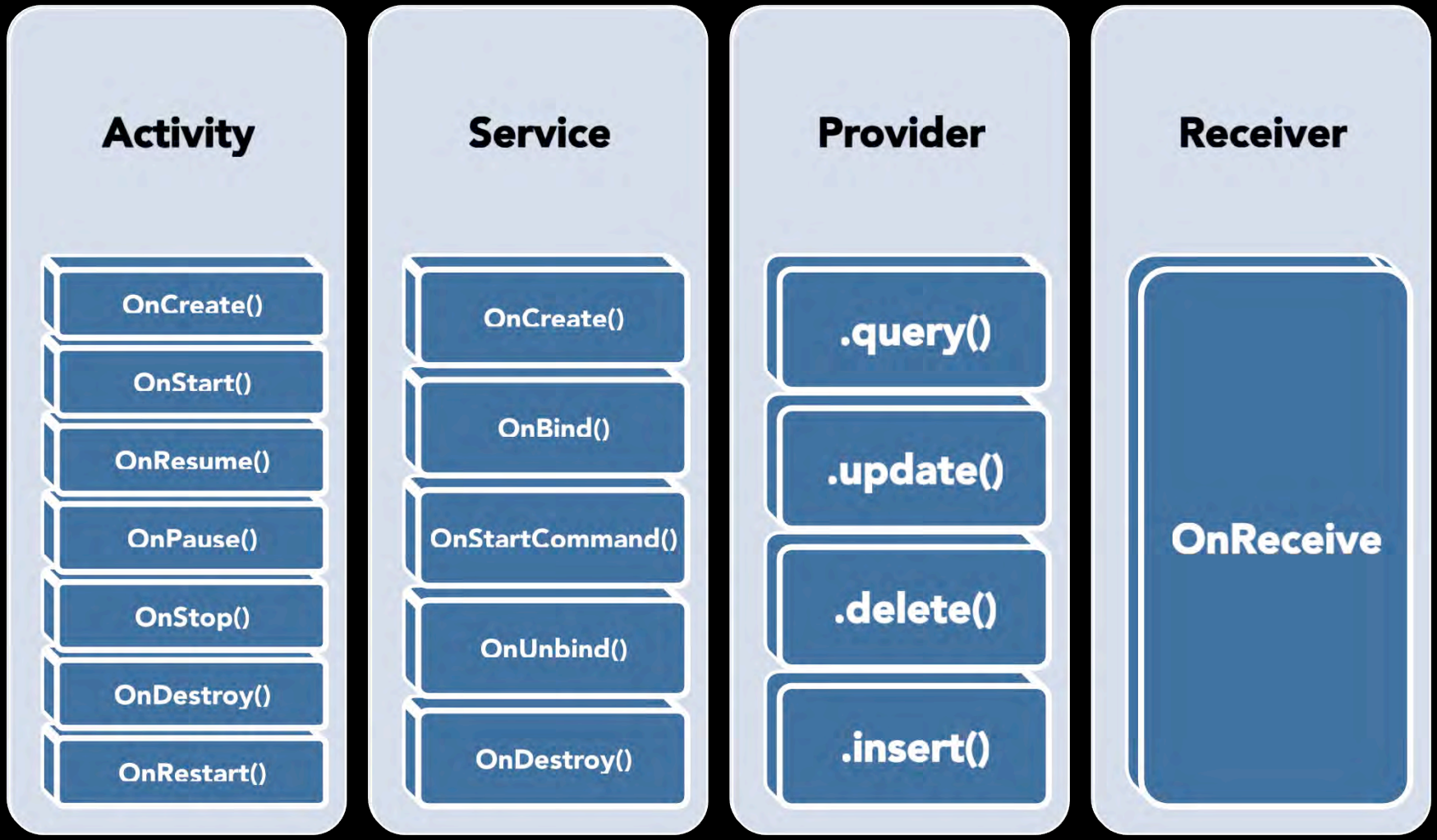
APK structure



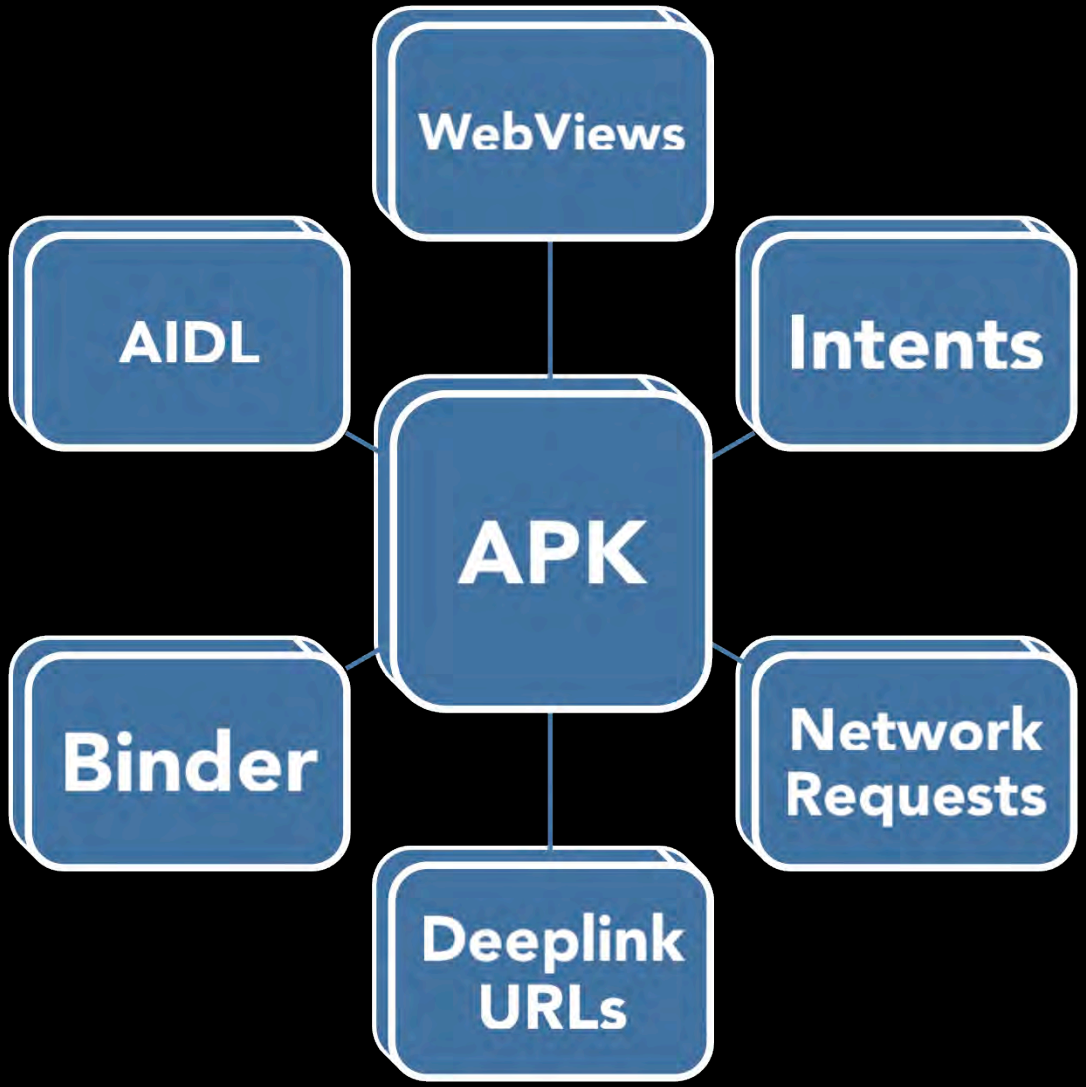
Reversing APKs



Components


Activity
OnCreate()
OnStart()
OnResume()
OnPause()
OnStop()
OnDestroy()
OnRestart()
Service
OnCreate()
OnBind()
OnStartCommand()
OnUnbind()
OnDestroy()
Provider
.query()
.update()
.delete()
.insert()
Receiver
OnReceive

Communications



What's (still) wrong with Android?

- Many sources – all the web bugs ++
- SSL/TLS fail – cert validation & plain-text HTTP
- Lots of old devices – glacial patch cycles
- Much client-side fail – no one will ever know…

What is QARK?

- Quick Android Review Kit
- Lots of stolen code
- Lots of stolen ideas
- Lots of stolen exploits
- Lots of (horribly written) Python
- A pinch of innovation

What QARK is not (yet)

- Perfect
- Finished
- A forensics tool
- A dynamic analysis tool

QARK motivation

QARK's mission

- Raise the bar for Android security
- Knowledge sharing
- Free SCA with validation
- Community involvement
- Motivate Google?

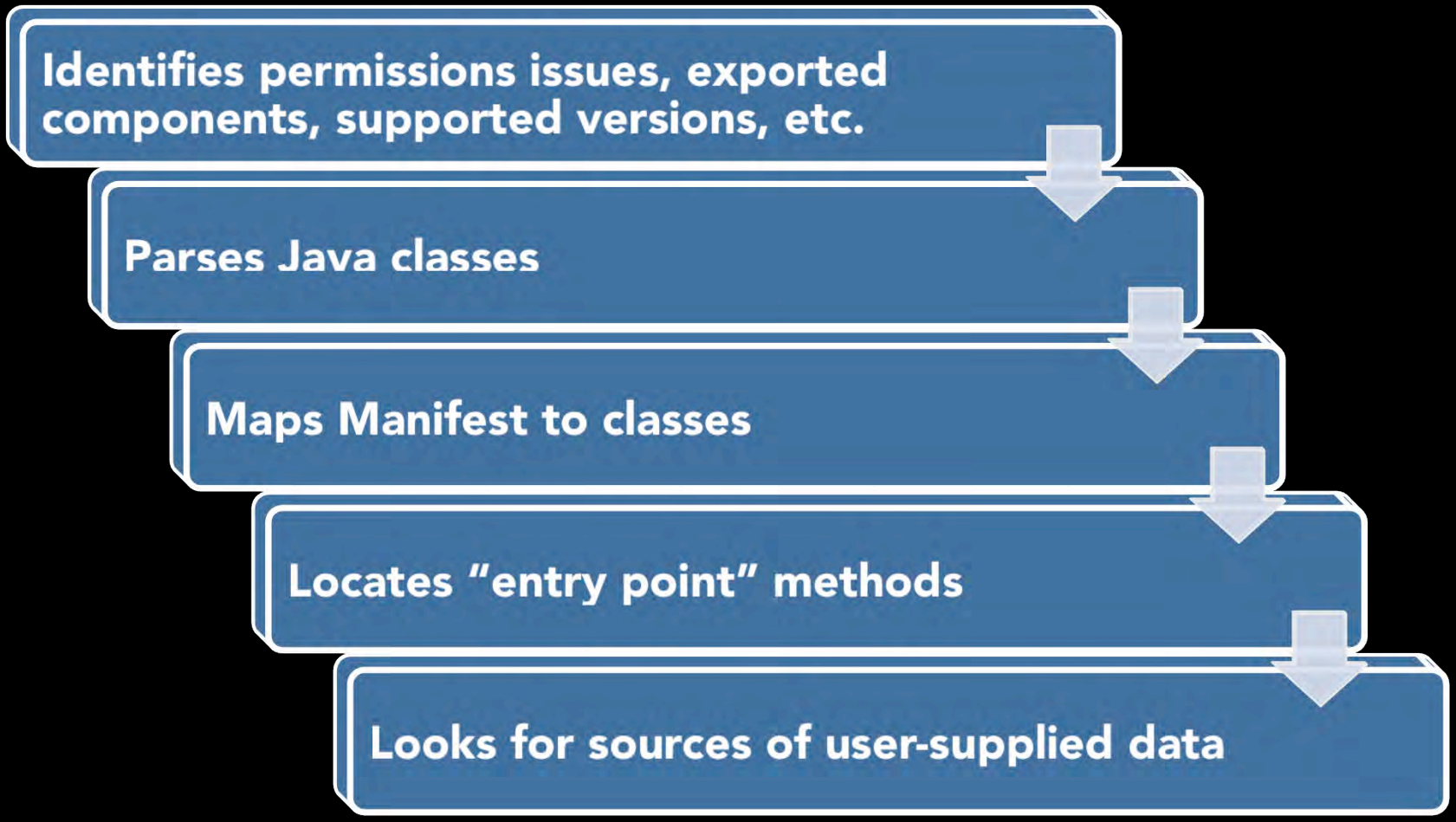
Under the hood

- Parsing: PLYJ, BeatifulSoup, Minidom
- Building: Android SDK
- Decompiling: Procyon, JD Core, CFR
- Code: Python (they made me do it)
- Tools: adb, dex2jar, apktool

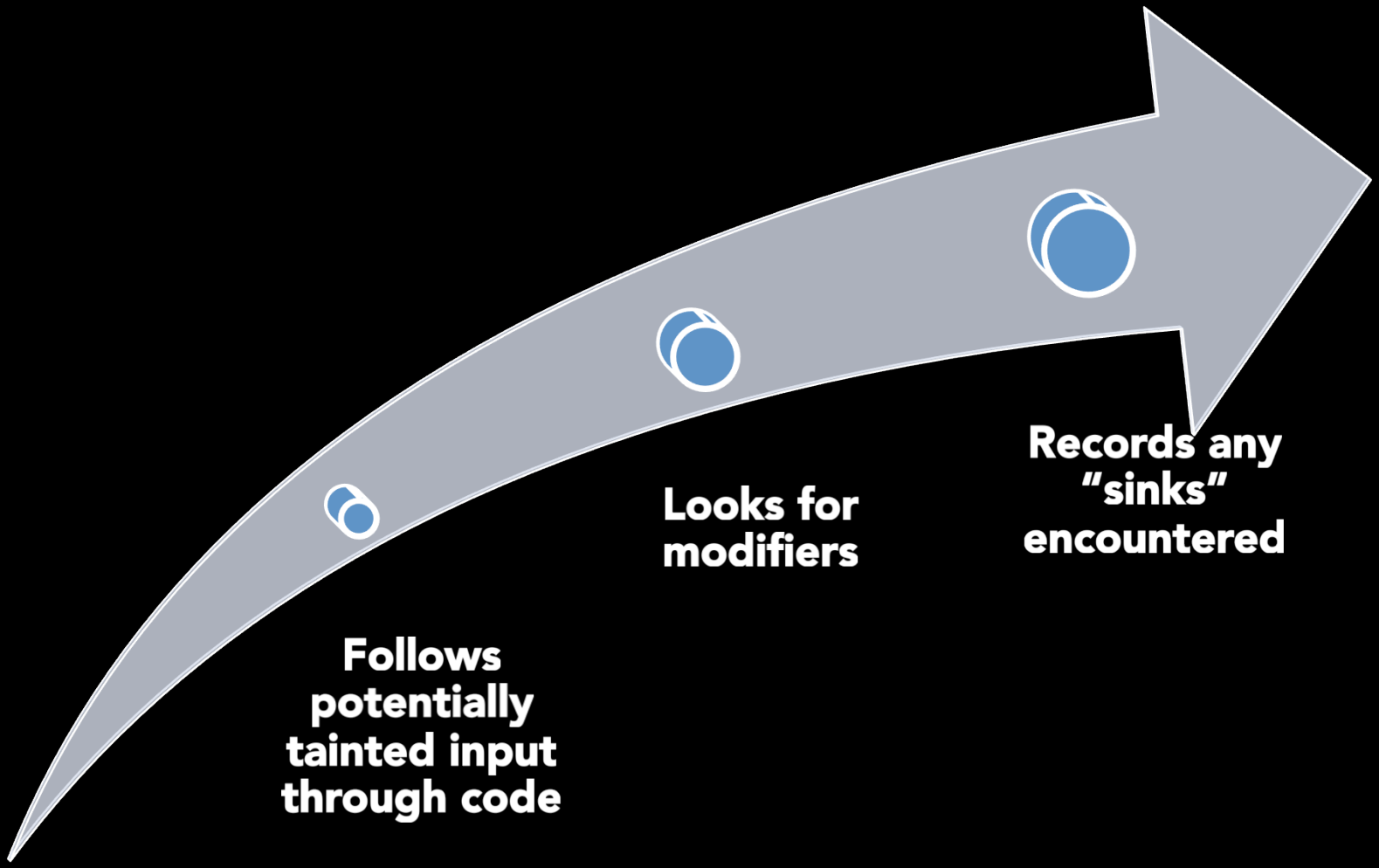
What does QARK do?

- Automates APK retrieval
- Decompresses APK
- Converts AndroidManifest.xml to text
- Parses AndroidManifest.xml

Tying it all together



What else?


Follows potentially tainted input through code
Looks for modifiers
Records any "sinks" encountered

Then what?

Combines the information gathered with manifest details for later use

Examines WebView configurations and provides templated HTML files for validation of vulnerabilities

Looks for vulnerabilities originating from within the app, inspecting Broadcast, Sticky and Pending Intents

What else?

- Looks for WORLDREADABLE/WRITEABLE files
- Looks for tapjacking defenses
- Looks for X.509 certificate validation issues
- Creates a "deliverable" HTML report of findings

The fun part

Builds an APK for manual testing with a swiss-army knife style set of functionalities

Automatically creates ADB commands to exploit discovered vulnerabilities

Automatically builds a custom exploit APK based on it's findings for point-and-click pwnage

Demo time!

Future plans

- Dynamic analysis functionality
- Contribute back to improve libraries and tools
- Handle obfuscated code
- Smali inspection
- Native code support
- Ask for your help

Where to get QARK?

LinkedIn's GitHub

https://github.com/linkedin

Acknowledgements

- NVisium for the TapJacking code
- Rafay Blaloch, et al, for the WebView exploits
- MWR Labs for Drozer (inspiration)
- The authors and maintainers of all the opensource projects used in QARK
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