

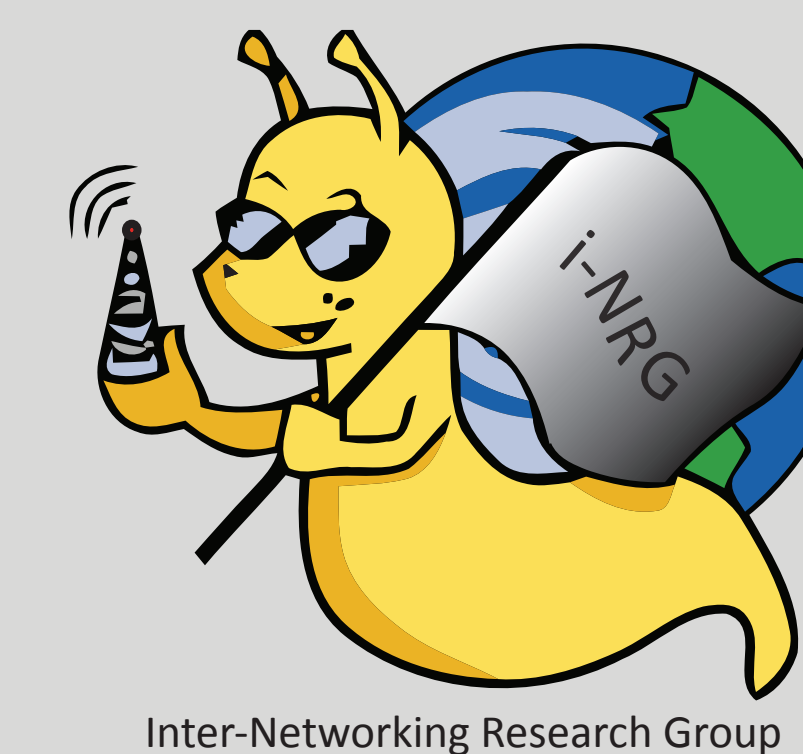


Data Collection: Putting It All Together

The SCORPION Statistics Collection System

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SCORPION Project Background

► Heterogeneous wireless networking testbed

► Consists of various mobile nodes



► Intended to test and evaluate wireless network protocols

- > multi-radio
- > multi-channel medium access control
- > multi-hop wireless ad-hoc routing
- > disruption-tolerant routing
- > disruption-tolerant message delivery
- > protocols with varying connectivity

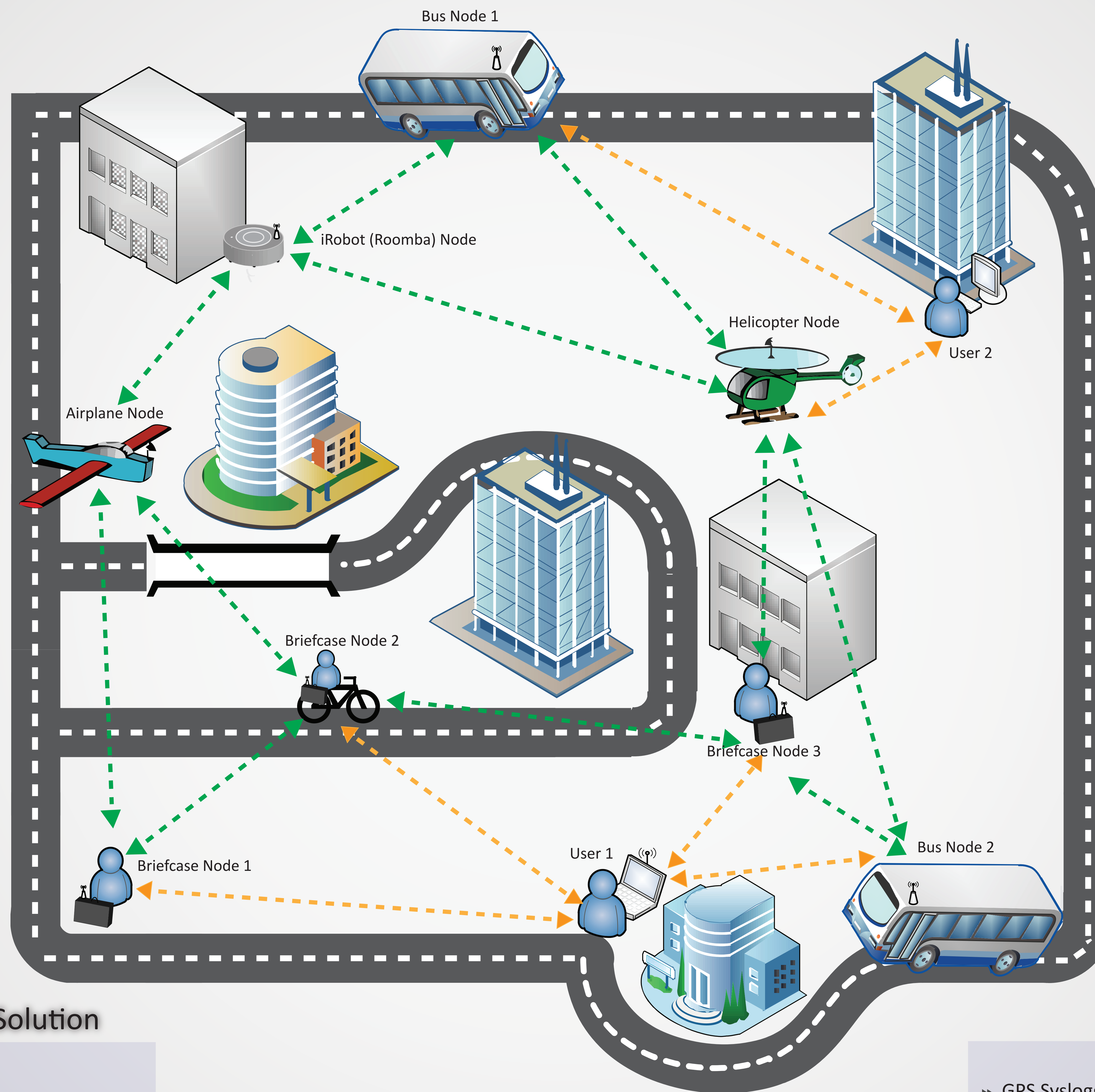
► Nodes allow testing of current and next-generation network applications

► Various projects using the testbed:

- > Epidemic Routing Protocol for Delay Tolerant Networks
- > UCSC's Bus Tracking System (BTS)
- > RTT estimation using the Experts Algorithm

► Data Collection Obstacles

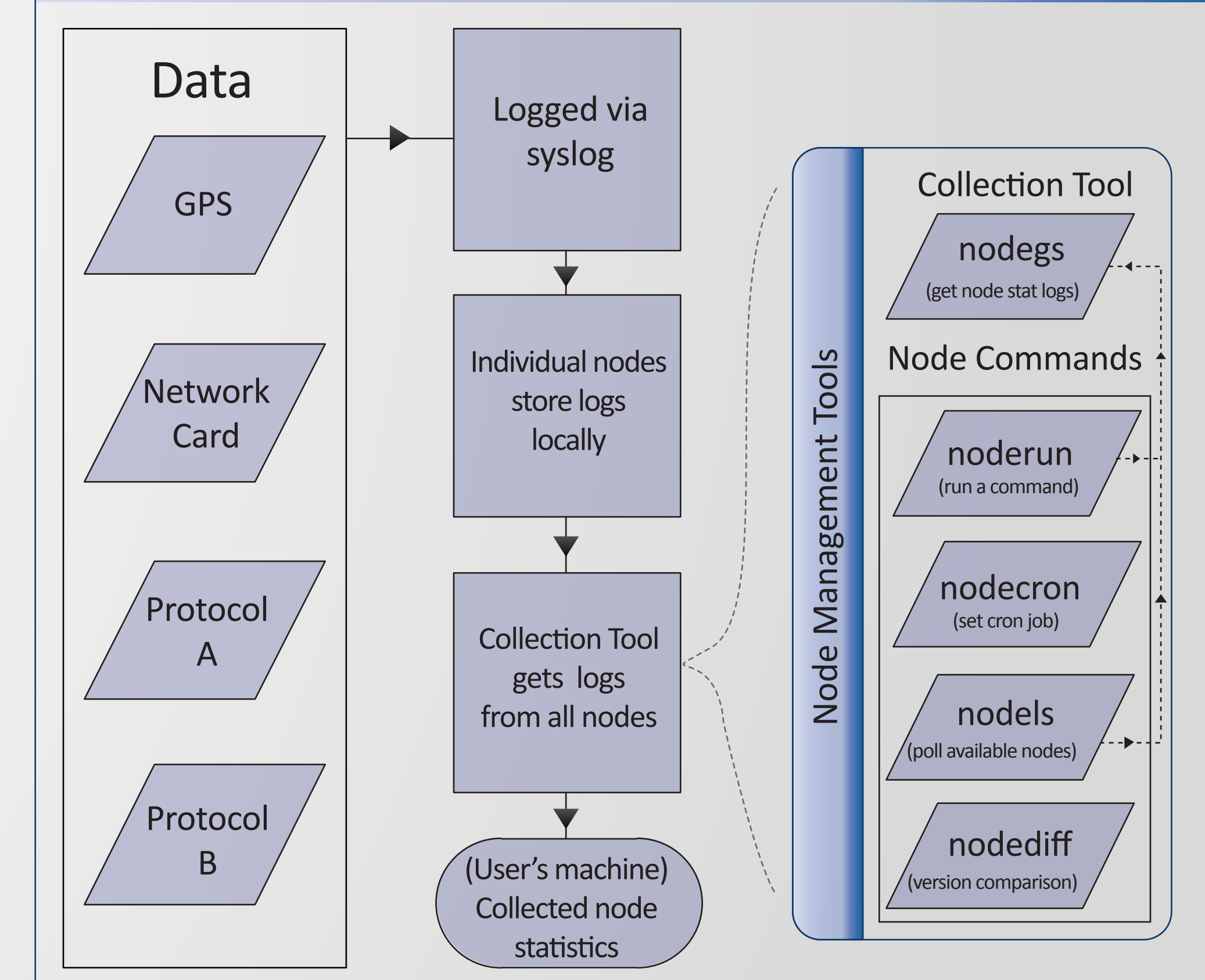
- > Manual collection of logs for each node is a time-consuming process due to potentially up to 88 nodes active at any given time
- > Nodes are mobile and may not all be in range



Data Collection Tool Overview

- User logs onto the "Testbed" network
 - > User issues the **nodegs** command to collect logs
- nodegs:
 - > polls the Testbed network for all available nodes
 - > issues a command which copies all SCORPION logs from each node to the user's machine

SCORPION Statistics Collection System



SCORPION Stat Logs

Network Monitoring and Data Collection Solution

► Logging

Standardize logging by using syslog to store logs in an easy to parse human readable format

- > syslog subsystem ready to use
- > available in most versions of Linux
- > customizable

Create a custom module

- > allow easy logging (using syslog) of experimental or protocol-specific information
- > drop-in code abstracting the details of syslog use

► Management

Create an easy to use module

- > collects all desired statistics related to running experiments
- > using both existing management tools and custom code
- > allows automated collection with as little user interaction as possible

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UC SANTA CRUZ

► GPS Syslogger Module

Statistics of interest:

- > GPS time, location (latitude and longitude), raw altitude, number of satellites, and speed (in knots)

► Network State Monitoring Module

Statistics of interest:

- > MAC address of neighbor, connection duration, signal strength, and # of bytes sent/received
- > Collected by using the libtrace library (<http://research.wand.net.nz/software/libtrace.php>) to decode and parse the 802.11 wireless/Radiotap headers

► Custom Protocol Logging Module

- > logInfo() function for custom logging: e.g. logInfo("formatted message: %d, ...", args, ...)
- > Log format: <System date and time> <computer-name> <PROTOCOL_NAME>[<PID>]: <Formatted message>