

# Bringing UWB Indoor Localization Closer to Being Universal and Pervasive

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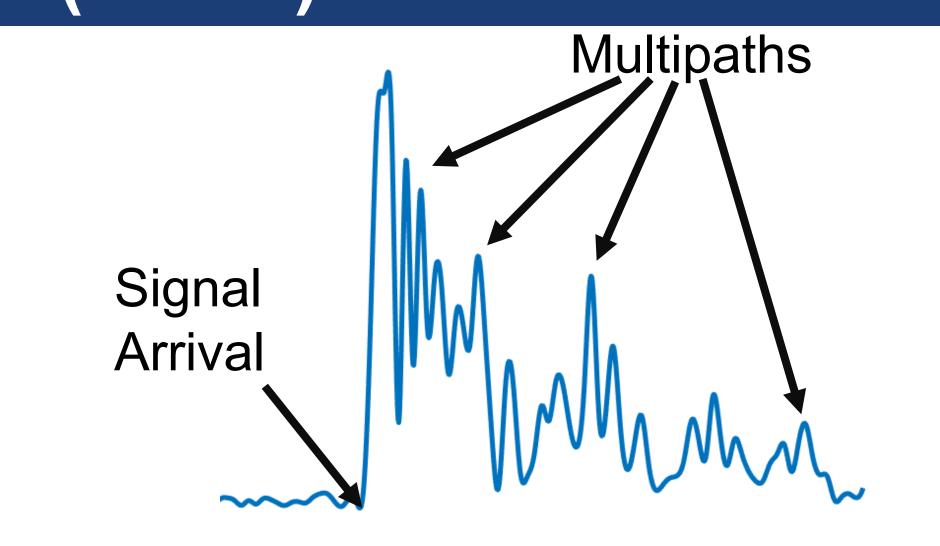
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## Why Ultra-Wideband (UWB)?

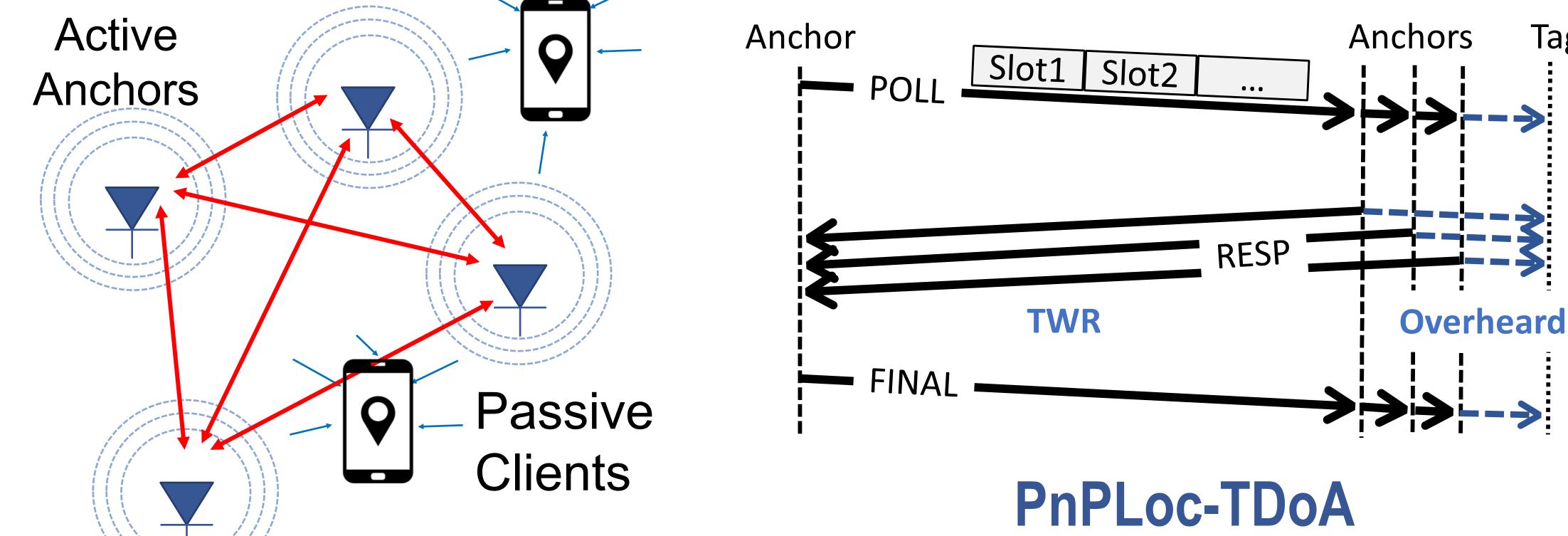
Gaps and Challenges

- Robustness against multipaths
- cm-level ranging accuracy
- Penetration through walls and obstacles
- Relatively low power



UWB Channel Impulse Response

System Design

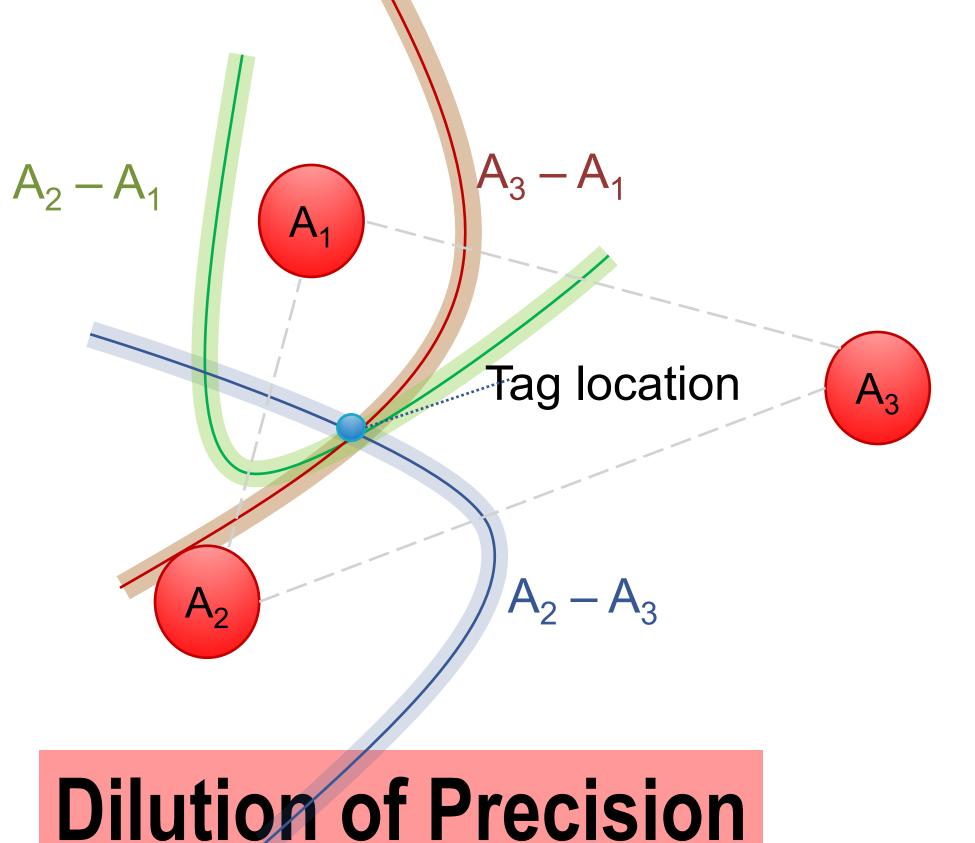


Scalable

Privacy Preserving

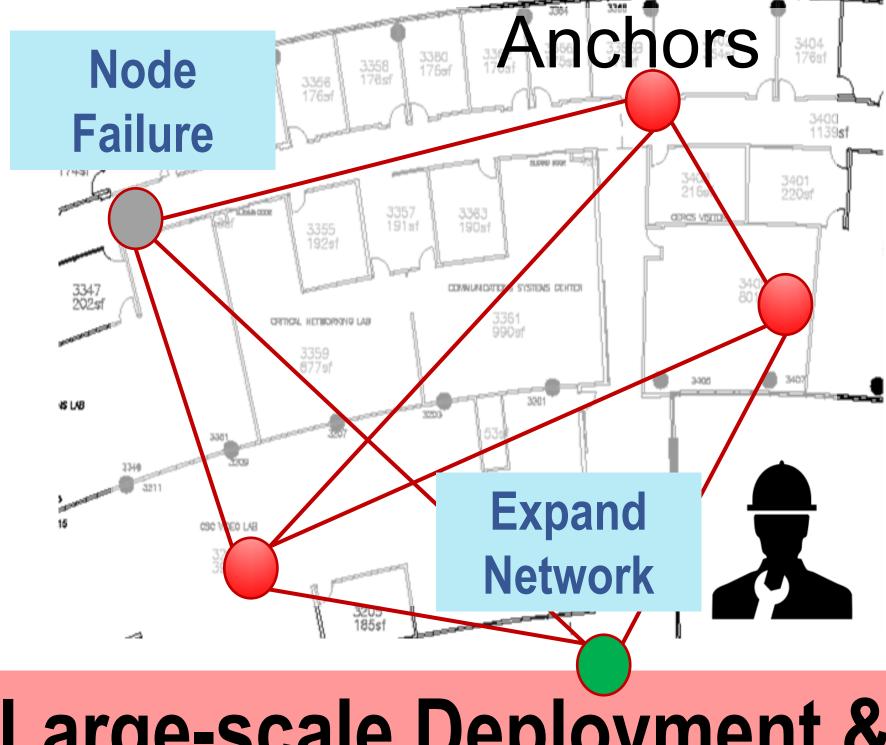
- Anchor nodes perform TWR continuously
- Tag overhears TWR messages and extracts its TDoAs to anchors

## Anchors Eavesdrop Scalability Privacy Support infinite User location/presence number of users should be private OPEN TO BELOW Collisions



Anchor geometry influences

localization accuracy

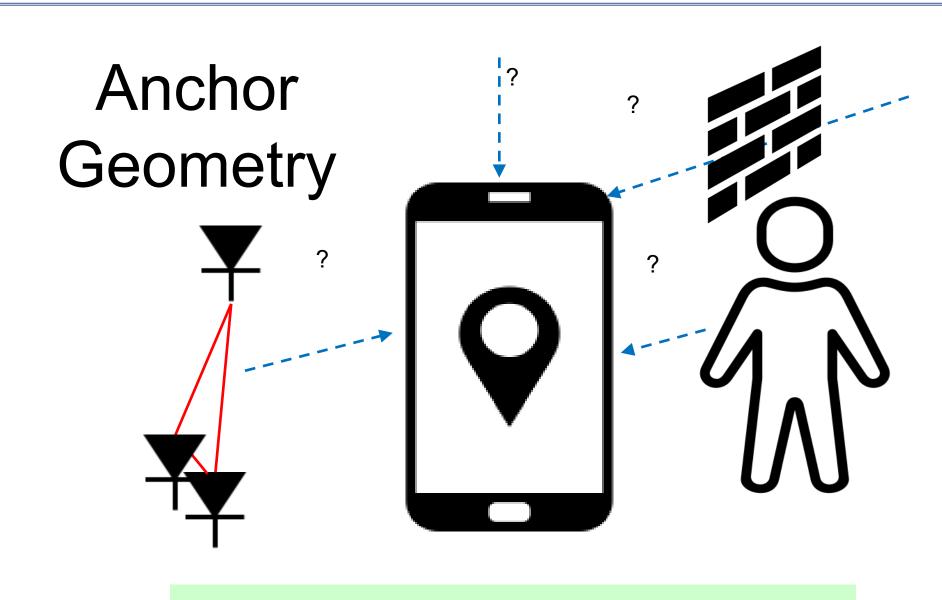


Large-scale Deployment & Maintenance

Make Infrastructure plug & play and robust

## Plug & play large-scale deployment

- Real-time guided deployment
- Self-organizing anchor network



## Improved precision

Anchor selection and filtering based on signal strength and DoP

### Demo

- Mobile phones with UWB tags handed to visitors to try out localization.
- Visitors can turn on/off anchor selection using a button to visualize the improvement introduced by our anchor selection algorithm.

Full paper: Haige Chen and Ashutosh Dhekne. PnPLoc: UWB Based Plug & Play Indoor Localization. IPIN 2022 (Best Paper Award)