

SMARTPHONES ARE THE KEY!

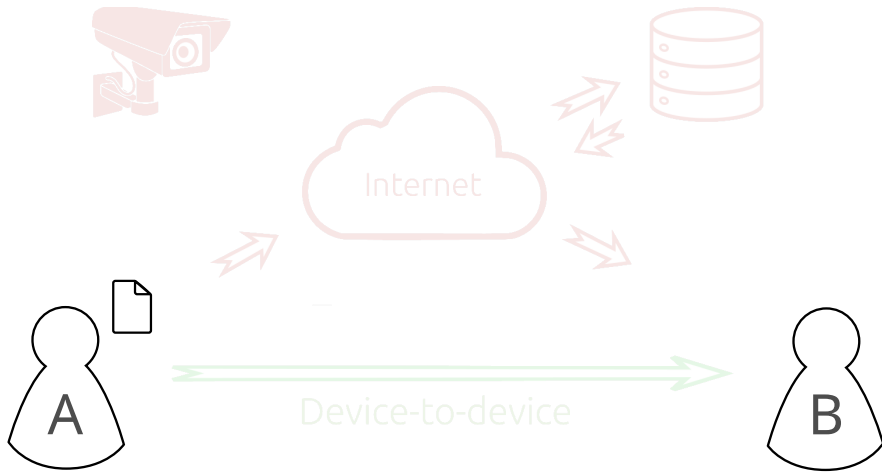
COMMUNICATION LOCALE : L'ÉTAT DU DEVICE-TO-DEVICE EN 2026

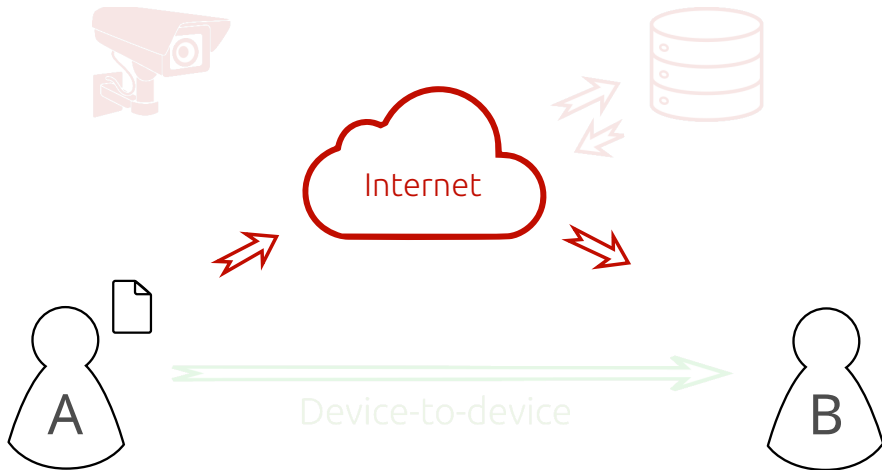
RÉMY RAES

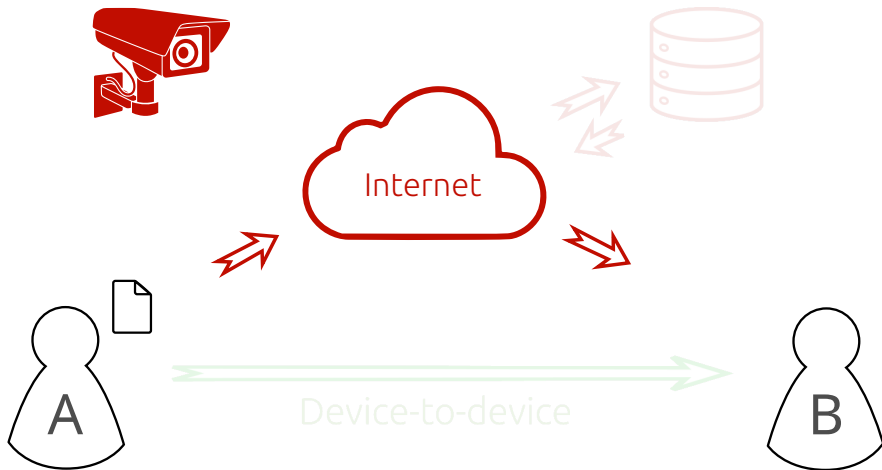
INRIA
UNIVERSITÉ DE LILLE

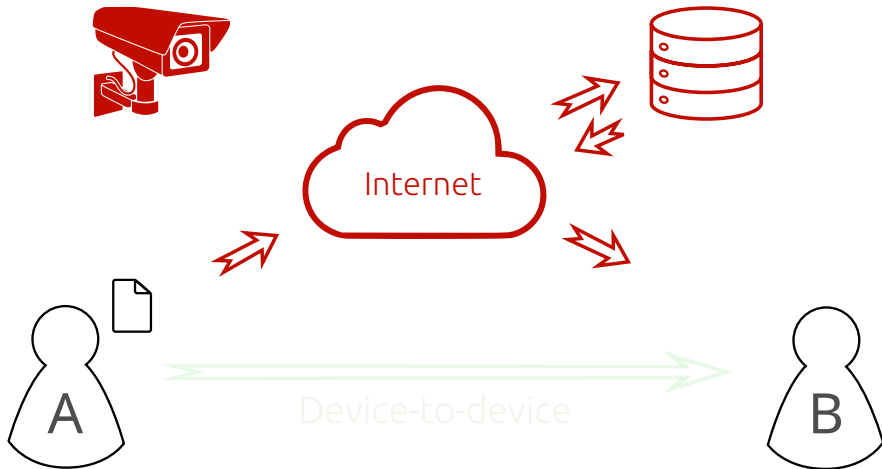
06-07-2026

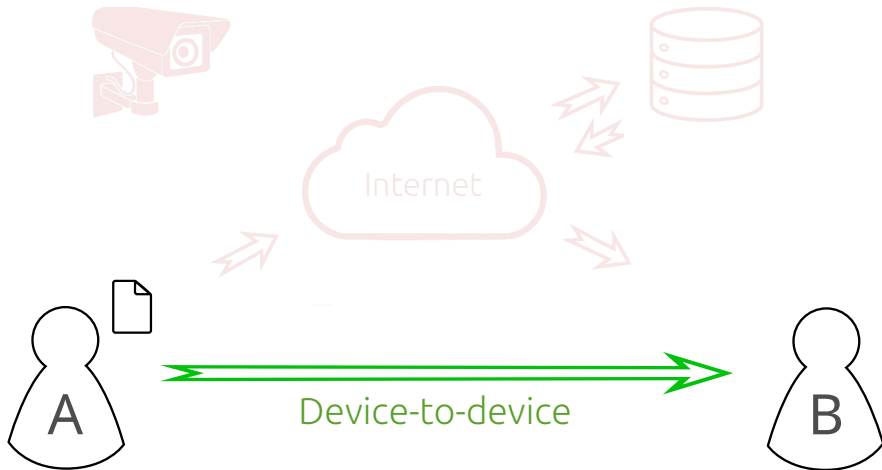












■ Many technologies

■ Widely deployed

■ Proprietary frameworks

- ▶ AirDrop
- ▶ Quick Share

Name	Specification date	Maximum distance	Maximum data rate
Optical			
Infrared (IrDA)	1994	Several meters	16 Mb/s
QR code-flashing	—	Around a meter	23.6 kb/picture
Wi-Fi			
802.11 (legacy)	1997	100 m	1-2 Mb/s
802.11ax (Wi-Fi 6E)	2021	100 m	1.2 Gb/s
802.11ay	2021	10 m	100 Gb/s
Bluetooth			
Bluetooth Core v1	1999	100 m	1 Mb/s
Bluetooth Core v5	2016	100 m	1-3 Mb/s
RFID			
NFC	2004	20 cm	106-424 kb/s
Ultra-WideBand			
UWB	2007	200 m	27 Mb/s

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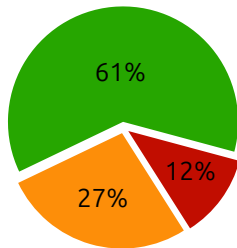
We realized a survey asking end users about their usage of communication technologies; it collected 364 answers.



Figure: Word cloud of received answers in the free-text feedback field.

Lauric Desauw, Adrien Luxey-Bitri, Rémy Raes, Romain Rouvoy, Olivier Ruas, et al. A critical review of mobile device-to-device communication. *DAIS 2025 - 25th International Conference on Distributed Applications and Interoperable Systems*, Jun 2025, Lille, France. (**hal-04198528v2**)

Weekly or more often



Less often

Monthly

Figure: Distribution of the frequency of the need for D2D communication.

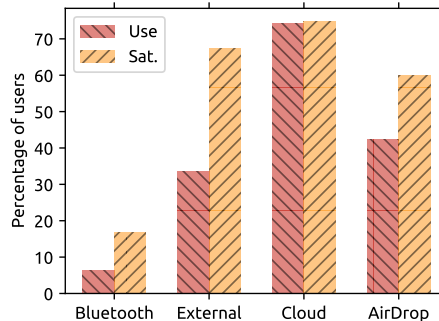
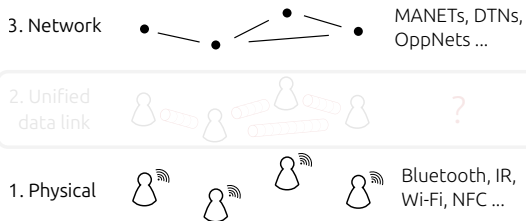


Figure: Use and satisfaction of the different available technologies.

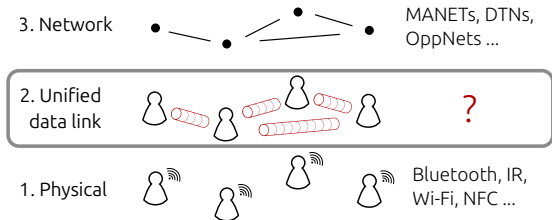
- Multiple technologies available
- Many use-cases
- Missing link in-between



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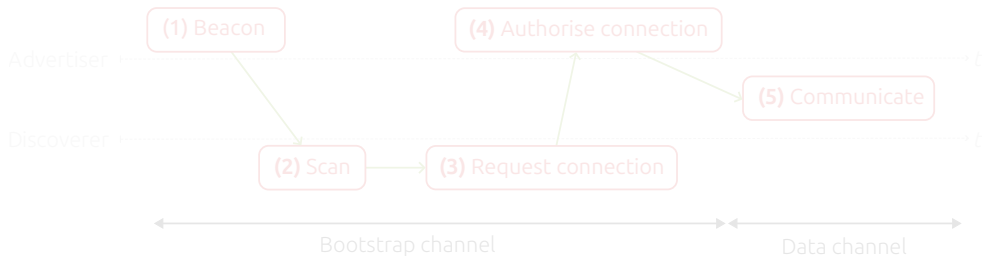


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- Multi-platform support (Android, iOS, Linux)

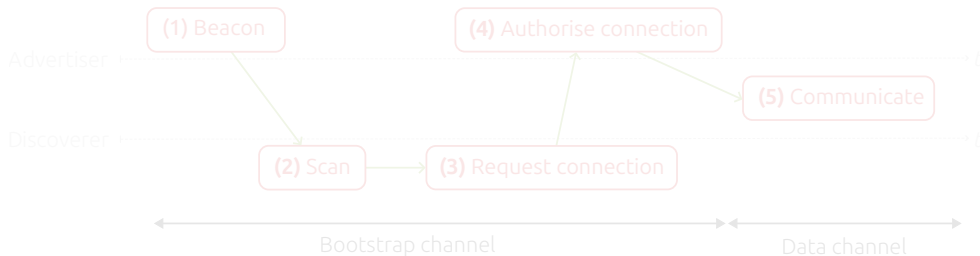
- Set of abstractions to support any tech implementation



Rémy Raes, Adrien Luxey-Bitri, Romain Rouvoy, Davide Frey, François Taïani. Venice: eschewing the cloud by leveraging local communication channels. ICT4S 2024 - International Conference on Information and Communications Technology for Sustainability, Jun 2024, Stockholm, Sweden. (hal-04576743)

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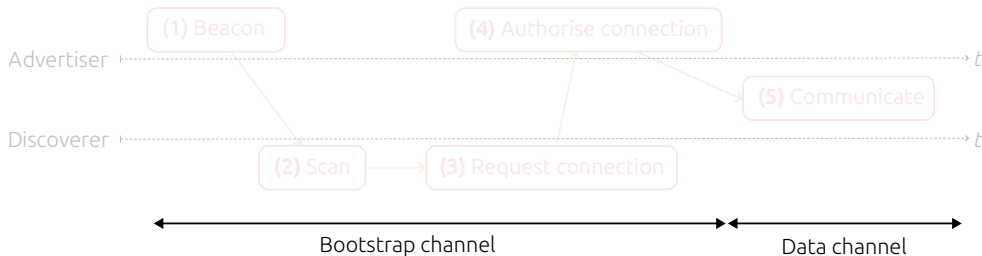
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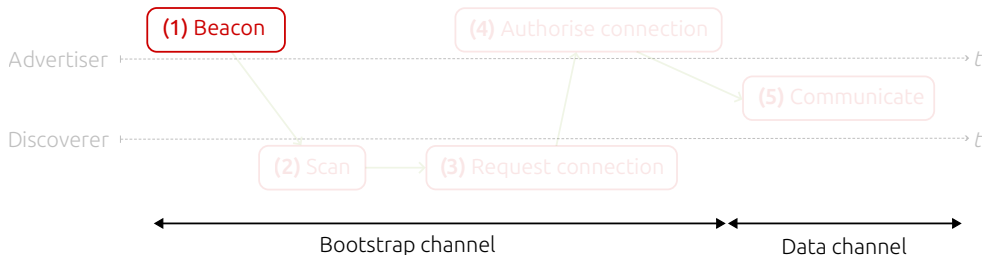
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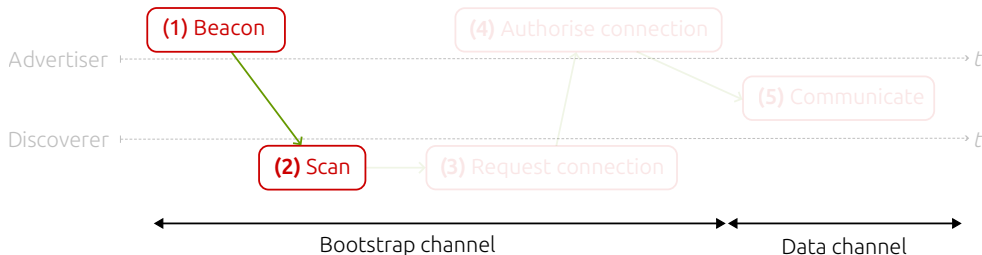
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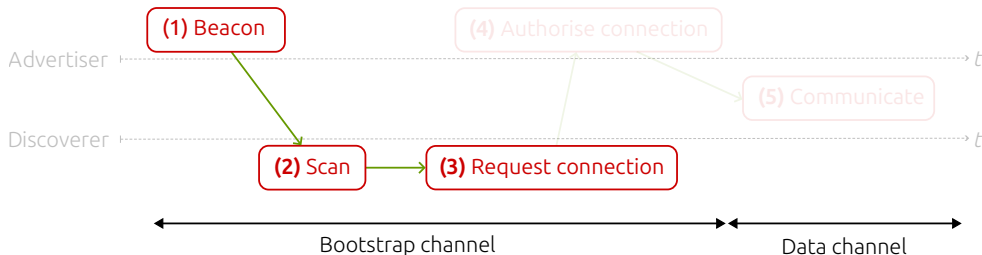
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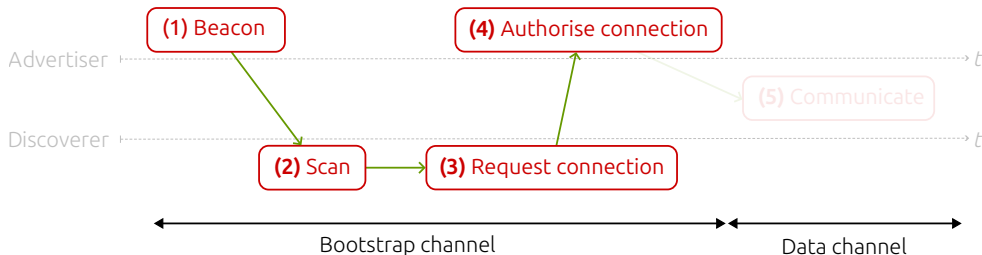
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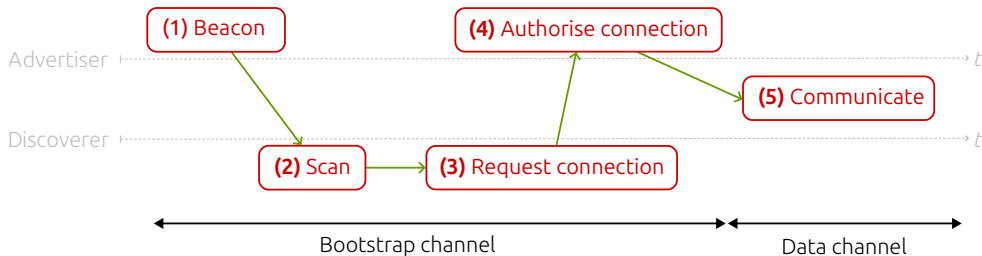
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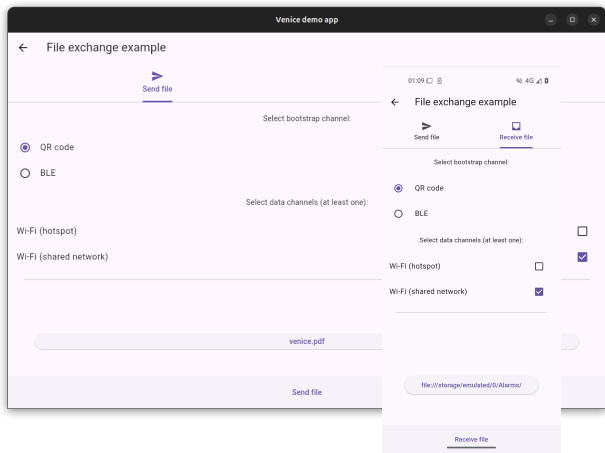
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■ Demo application

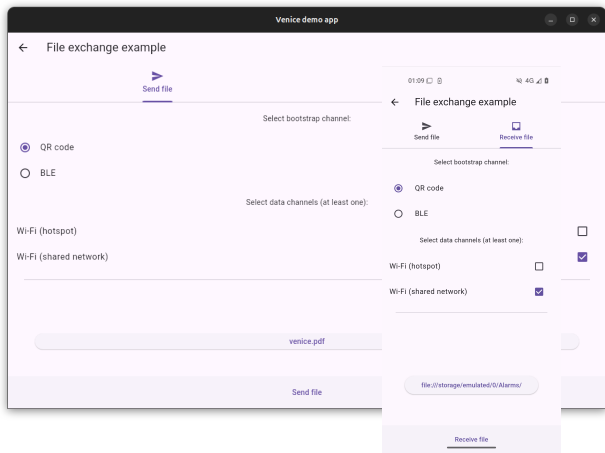
■ Manual choice of channels

■ Several use-cases:

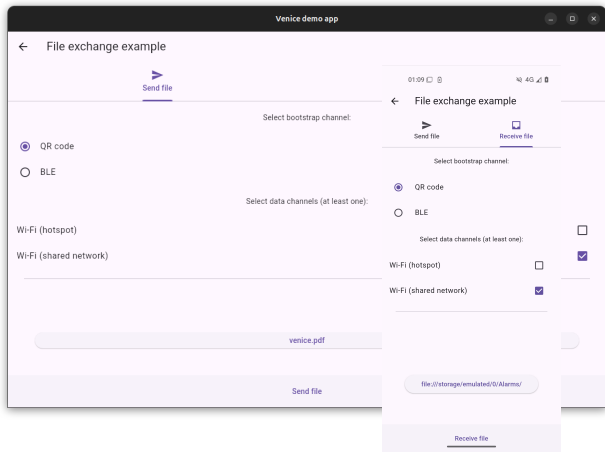
- ▶ Text copy-pasting
- ▶ File exchange
- ▶ Video streaming



- Demo application
- Manual choice of channels
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- Uneven system API support
- Tedious integration process
- Creating a multi-platform framework requires multi-platform knowledge
- Missing high-level API

PeripheralManager

API	Android	iOS	macOS	Windows	Linux
state	✓	✓	✓		✓
stateChanged	✓	✓	✓		✓
authorize	✓				
showAppSettings	✓	✓			
connectionStateChanged	✓				
mtuChanged	✓				✓

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```
@override
Future<void> initReceiver() async {
  ConnectionData? connectionData;
  await centralManager.setUp();

  // Wait for Bluetooth to be ready
  while (await centralManager.getState() != BluetoothLowEnergyState.poweredOn) {
    debugPrint("Waiting for Bluetooth to be ready...");
    await Future.delayed(const Duration(milliseconds: 500));
  }

  // Start listening to devices
  centralManager.discovered.listen((event) async {
    String? advName = event.advertisement.name;
    if (advName != "venice") {
      return;
    }

    // Explore device only if it's Venice compatible
    await centralManager.stopDiscovery();
    await centralManager.connect(event.peripheral);

    // Retrieve data channel data from the correct service/characteristic
    List<GattService> services = await centralManager.discoverGATT(event.peripheral);
    List<GattService> matchingServices =
      services.where((element) => element.uuid == veniceUuid).toList();

    GattCharacteristic distantChannelCharacteristic =
      matchingServices.first.characteristics
        .firstWhere((element) => element.uuid == veniceChannelCharacteristicUuid,
          orElse: () => throw RangeError("Channel characteristic not found."));

    Uint8List cValue = channelNullValue;
    do {
      cValue = await centralManager.readCharacteristic(distantChannelCharacteristic);
      await Future.delayed(const Duration(seconds: 1));
    } while (cValue.toString() == channelNullValue.toString() || cValue.isEmpty);

    ChannelMetadata channelMetadata = ChannelMetadata( utf8.decode(cValue).split(";") );
    // Data channel can now be opened...
  })
}
```

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PeripheralManager

API

Android iOS macOS Windows Linux

sta					
sta					
au					
sh					
connectionStateChanged			✓		
mtuChanged		✓			✓

THANKS FOR LISTENING!



Storage

1. FLI
2. FLInD



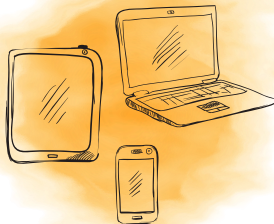
Computing

3. INTACT



Energy

6. Simply the Best



Terminals



Communication

4. Survey
5. Venice