



5G Brasil

Research and Use Cases

Luciano Mendes – Inatel

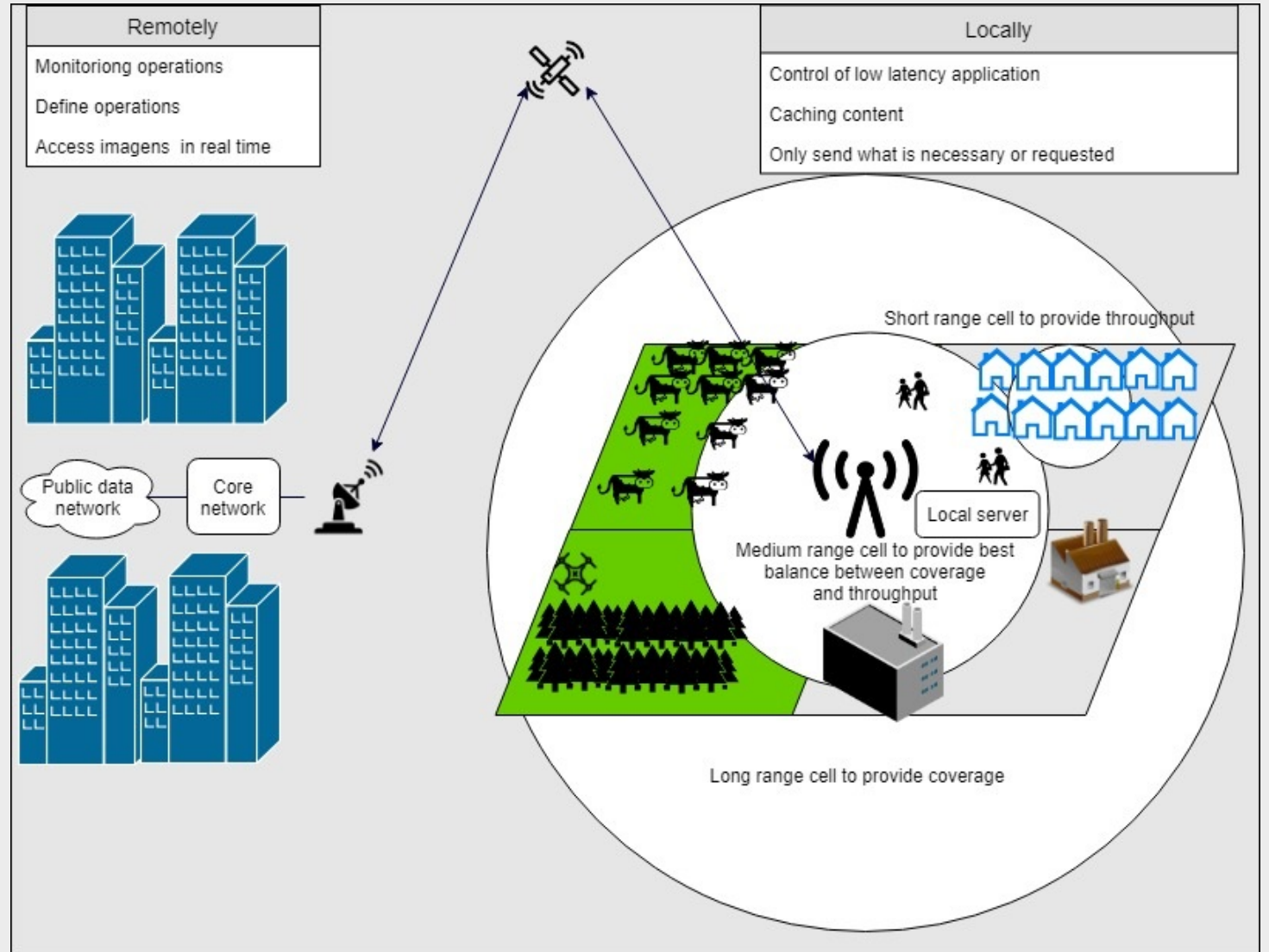
Motivation

- Analyze the 5G scenarios and verify how the Brazilian needs can be addressed by the future mobile networks.
- Two main projects have been selected:
 1. 5G and Satellite Networks integration.
 2. IoT services for agribusiness and security applications.

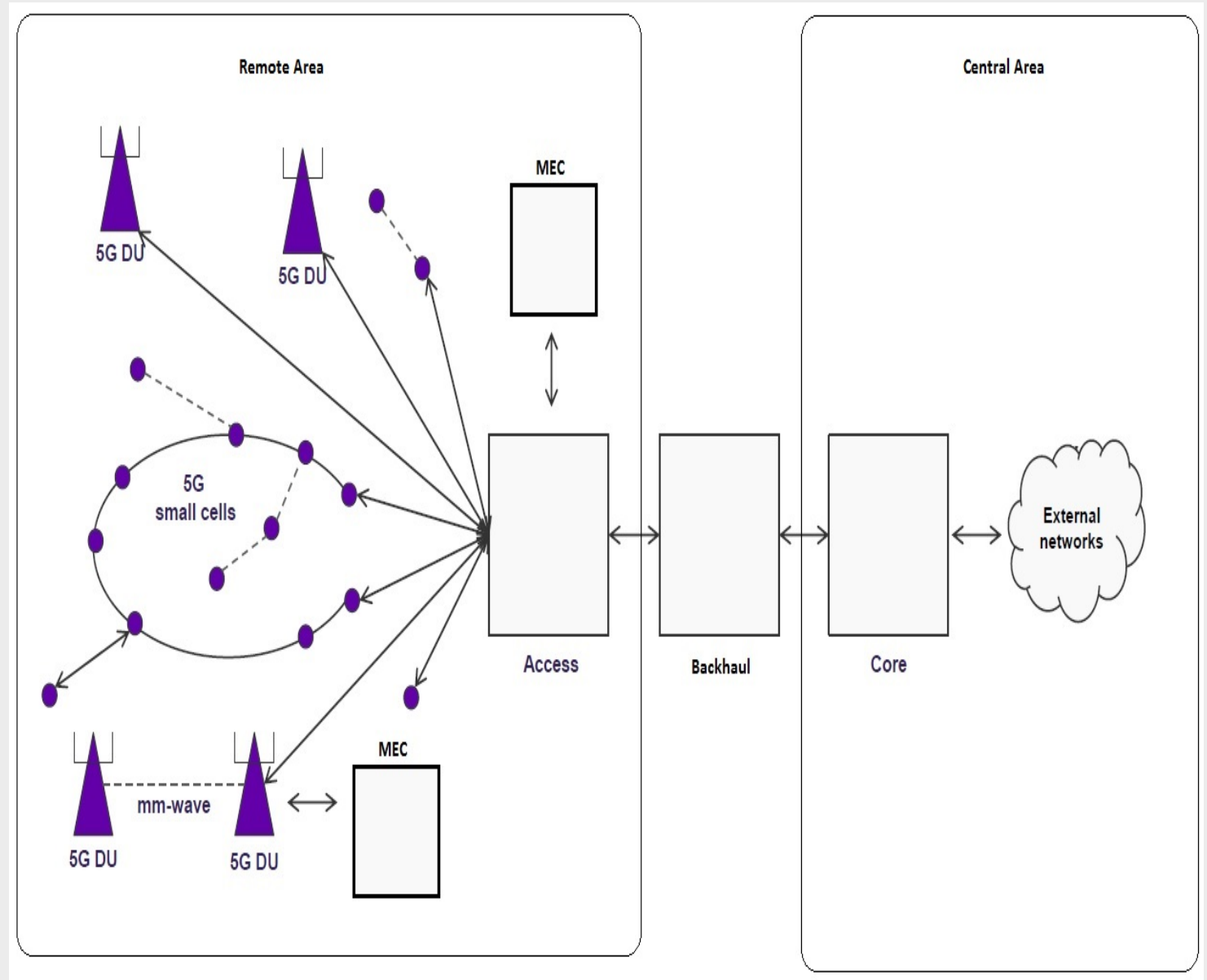
5G and Satellite integration

- Use of satellite networks as backhaul for 5G base stations in remote areas.
- Analysis of the latency impact in 5G services.

5G and Satellite Architecture



5G and Satellite Simulation



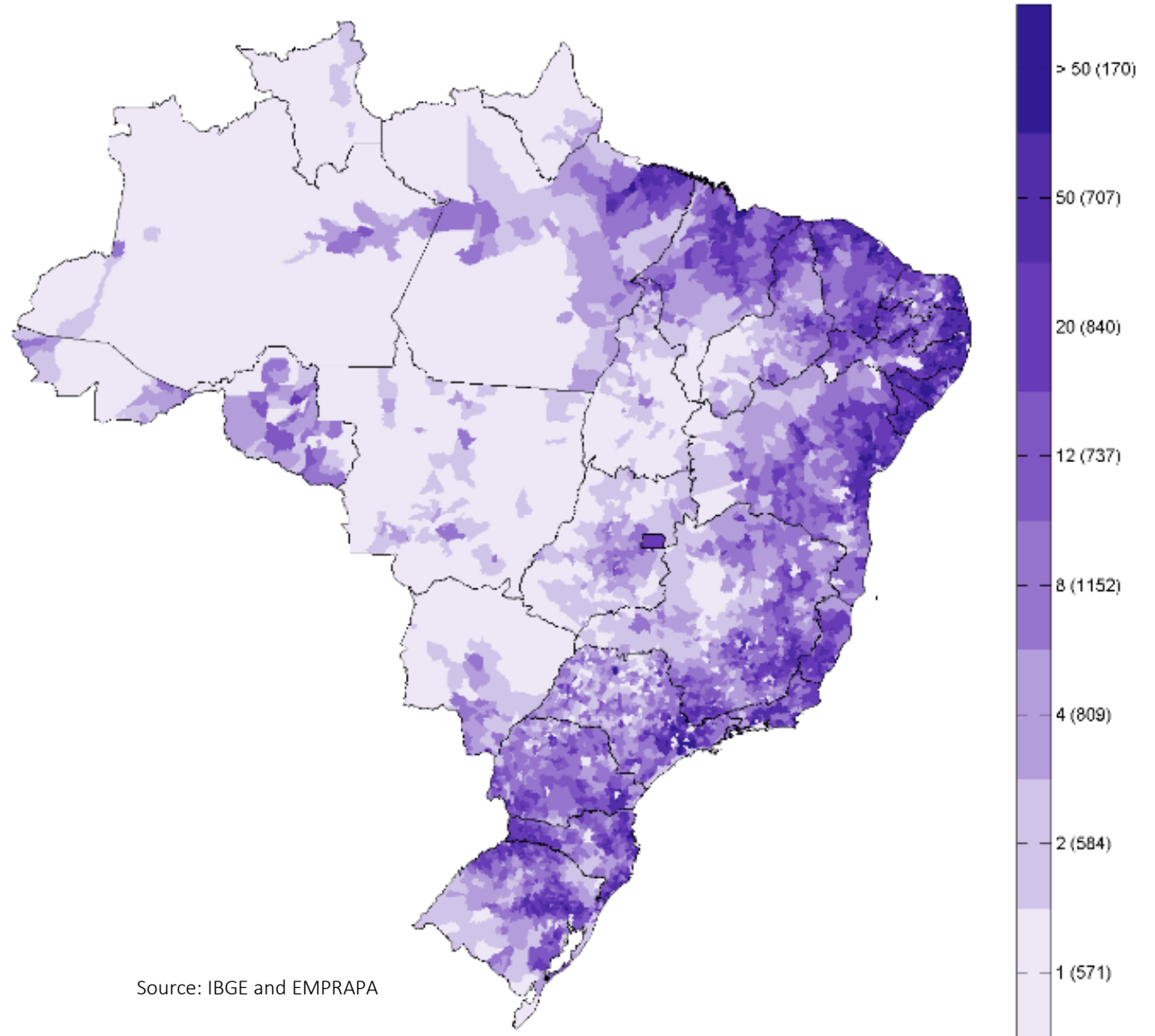
IoT and the Brazilian use cases

- Agribusiness is an important vertical for IoT in Brazil:
 1. Cattle monitoring
 2. Logistics
 3. Automation of the fields processes
 4. Environment and crop information gathering

Brazilian Agribusiness Scenario

	Brazil [millions ha]	Midwest	Northeast	North	Southeast	South
Soy	33.3	44.98	8.70	4.80	6.90	34.63
Corn	16.0	44.72	15.53	3.73	13.04	22.98
Sugar cane	10.2	18.52	9.75	0.58	64.33	6.82
Coffee	2.0	0.99	8.42	4.46	84.16	1.98
Orange	0.7	1.35	20.93	2.99	67.26	7.47
Cows	-	34.4	13.0	22.0	18.0	12.6
Porks	-	14.9	14.6	3.6	16.9	50.0
Chickens	-	12.8	11.5	3.8	26.6	45.3

Population density in Rural Areas



Source: IBGE and EMPRAPA

IoT for Rural Areas Main Challenges

- How to provide reliable coverage?
- What is the impact of a high latency system in control and automation applications in remote areas?
- How to reduce the subscriber's costs?

Conclusions

- Rural and remote areas is a critical scenario in Brazil that must be addressed by 5G Networks.
- Reliable and cost-effective coverage in rural area is key for improving the productivity and efficiency of agribusinesses.
- Low latency applications might require fog computing for dealing with high latency backhaul.