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## Broadband networking the Public Administration in Emilia-Romagna: a case study

IDATE Conferenc  
Montpellier, 19-21 November 200

# Emilia-Romagna at a glance



- Area: 22,120 km<sup>2</sup>
- Population: 4,000,000
- Per capita GP: 25,733 €



- **Regional administration**
- **Provincial administrations (9)**
- **Municipal administrations (341)**
  - » public libraries and public schools
- **Health care system**
- **Universities (5)**
- **Utility companies**
  - » one for the four easternmost provinces of the Region
  - » one or more per province in the north western part of the Region
  - » majority of capital or shares owned by municipal administrations

# Objectives

- **Interconnect all local PA with broadband links and services (e-government)**
- **Promote a one-stop-shop approach for communication services for all local PA within the region**
- **Make the region as a whole more competitive by improving and easing access to broadband services for businesses and citizens as well**
- **Mitigate the digital divide**

# Decisions to make

- **Technology spectrum (fibres and other options)**
- **Network ownership (dark fibres) vs. connectivity procurement from telco's**
- **In-house vs. outsourced network administration, operations, and management**

- **Fibre optics**

- » + unlimited bandwidth
- » + meets existing and future needs
- » - very expensive
- » - not available from telco's everywhere

- **Alternative technologies have been identified for areas which is not feasible to interconnect via fibre optics:**

- » 2-way satellite
- » xDSL

# Implementation options: buy or make?

- **Lease capacity / Buy services from national / international telecom operators**
  - » + no upfront expenses
  - » - no added value for the local area
  - no universal service available
  - long-term contracts needed to lower cost
- **Become the owner of the infrastructure**
  - » + universal service achievable
  - + promotion of the local area
  - + long-term investment
  - + upgrade capacity (node technology)
  - » - major investments required

# Operations options: in-house or outsource?

- **In-house network operations**

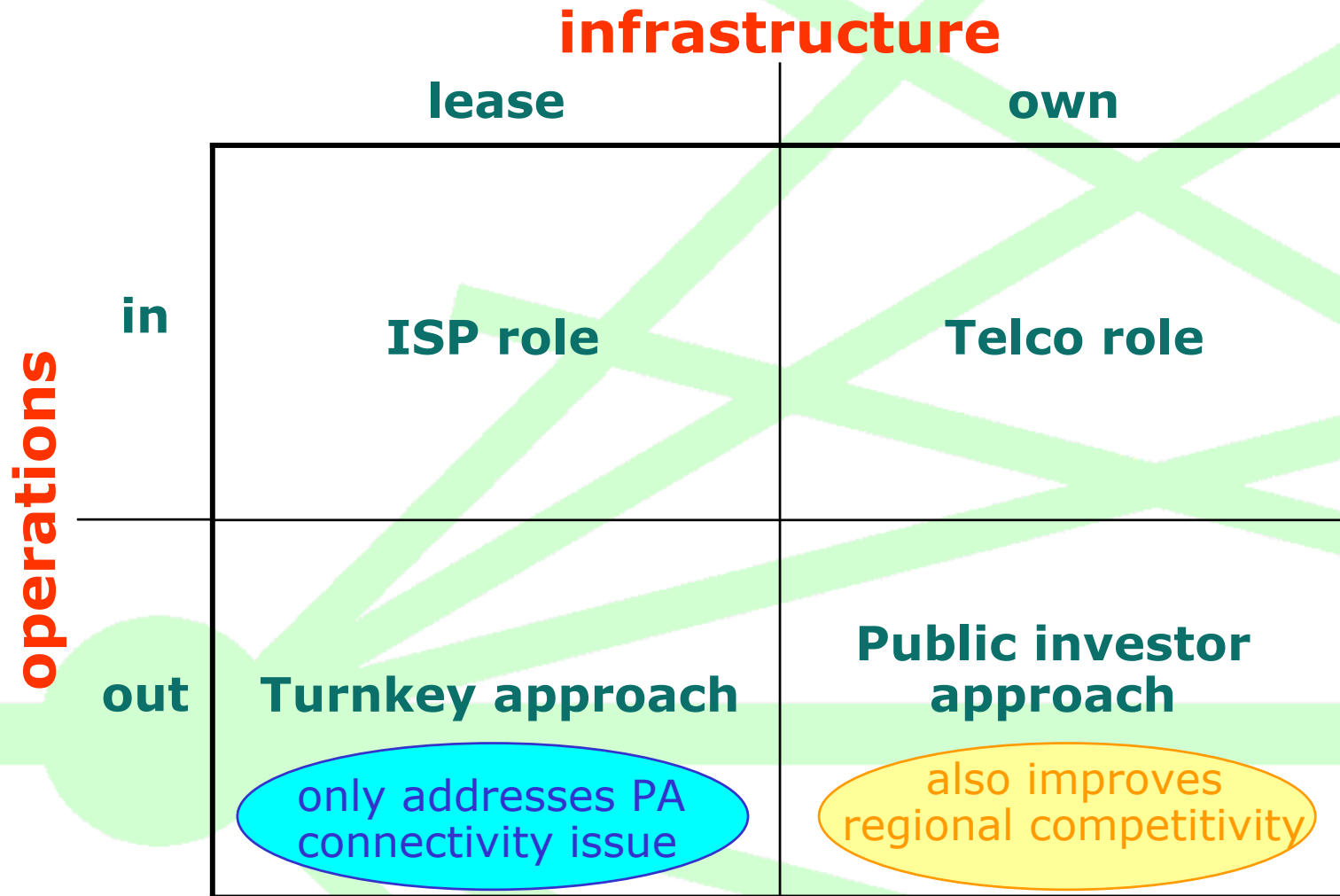
- » + full control?
- » - not a public administration mission
- network node technology evolution
- short-term investment

- **Outsource network operations**

- » + no investment in evolving technology
- + state-of-the-art equipment
- » - lack of control?



# What role for the PA?



- **Technology spectrum**
  - » fibre optics wherever feasible (assets)
  - » otherwise 2-way satellite or xDSL
- **Network owned**
  - » reach potentially discriminated areas
  - » bring broadband infrastructure everywhere
  - » purchased from **utility companies**
  - » **additional capacity** for private users
- **Network operations outsourced**
  - » to **utility companies** for all technologies
  - » set performance and SLA
  - » set up a regional control centre

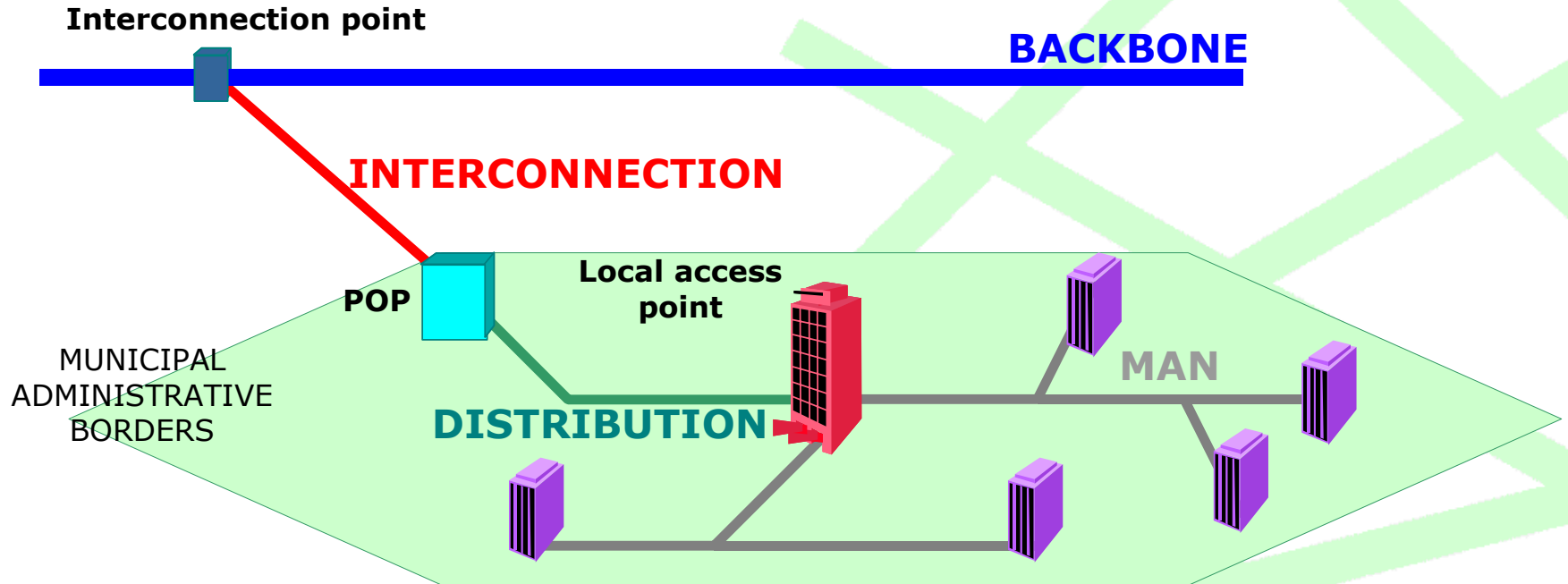
# Roll-out roadmap

- **Sign framework agreements with provincial and municipal administrations**
- **Exploit all suitable publicly owned assets**
- **Purchase network implemented by the local public utility, who**
  - » commits to implementing **additional capacity for the private market** in line with own business and industrial plan
- **Outsource network operations to the local public utility, who**
  - » provides and maintain network node equipment
  - » provides services according to given SLA

# Identified assets

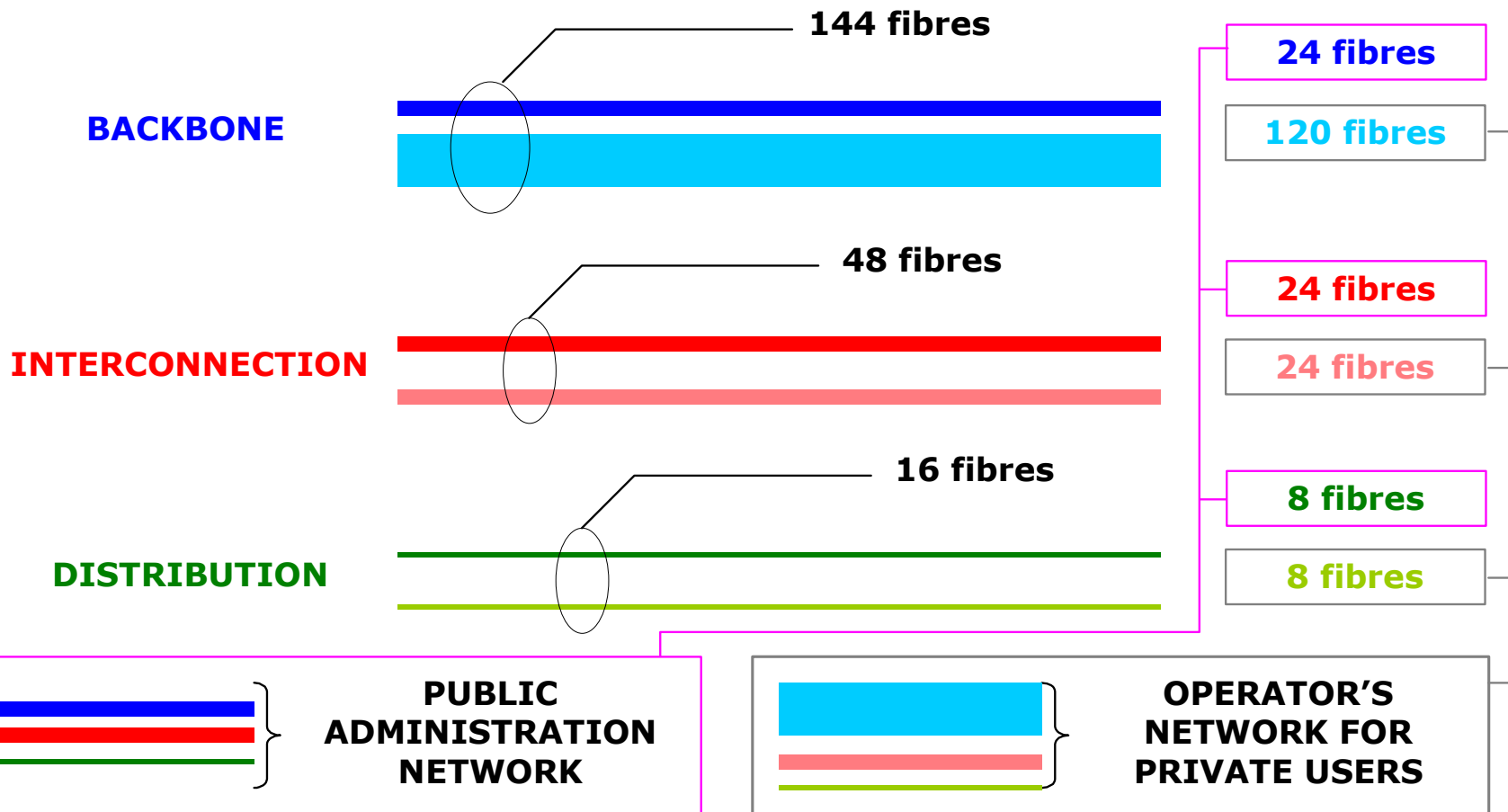
- **Acquedotto della Romagna**
  - » empty ducts
- **Regional Railway**
  - » empty ducts
- **Overhead public lighting cables**
- **Bicycle trails**
  - » almost negligible marginal costs
- **Building and maintenance of other types of networks**
  - » almost negligible marginal costs
- **Road building and maintenance**
  - » almost negligible marginal costs

# Backbone vs. MAN

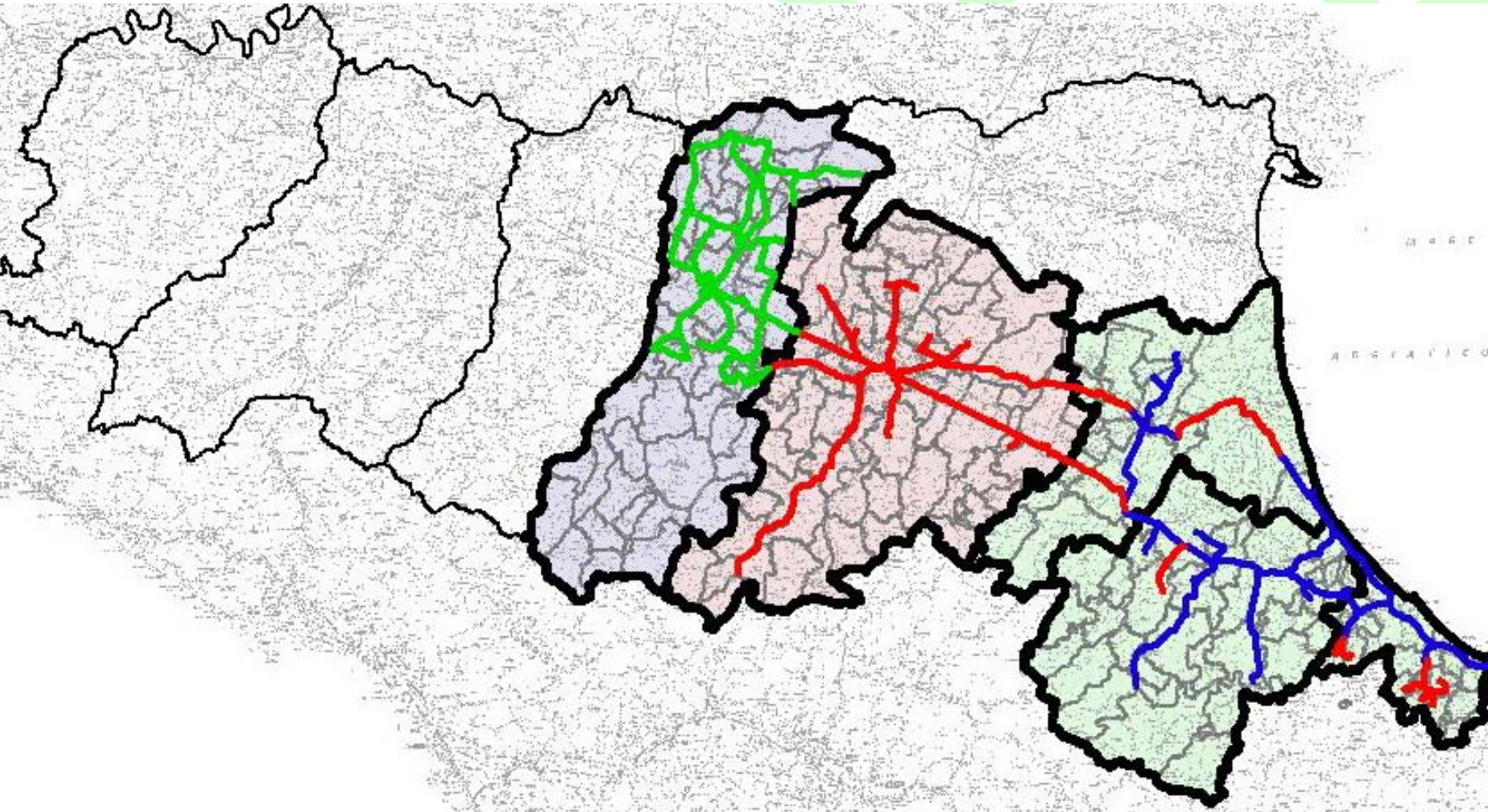


- **Regional administration:** backbone, interconnection and distribution to **one local access point** within municipal borders
- **Local administration:** MAN interconnects all the PA premises

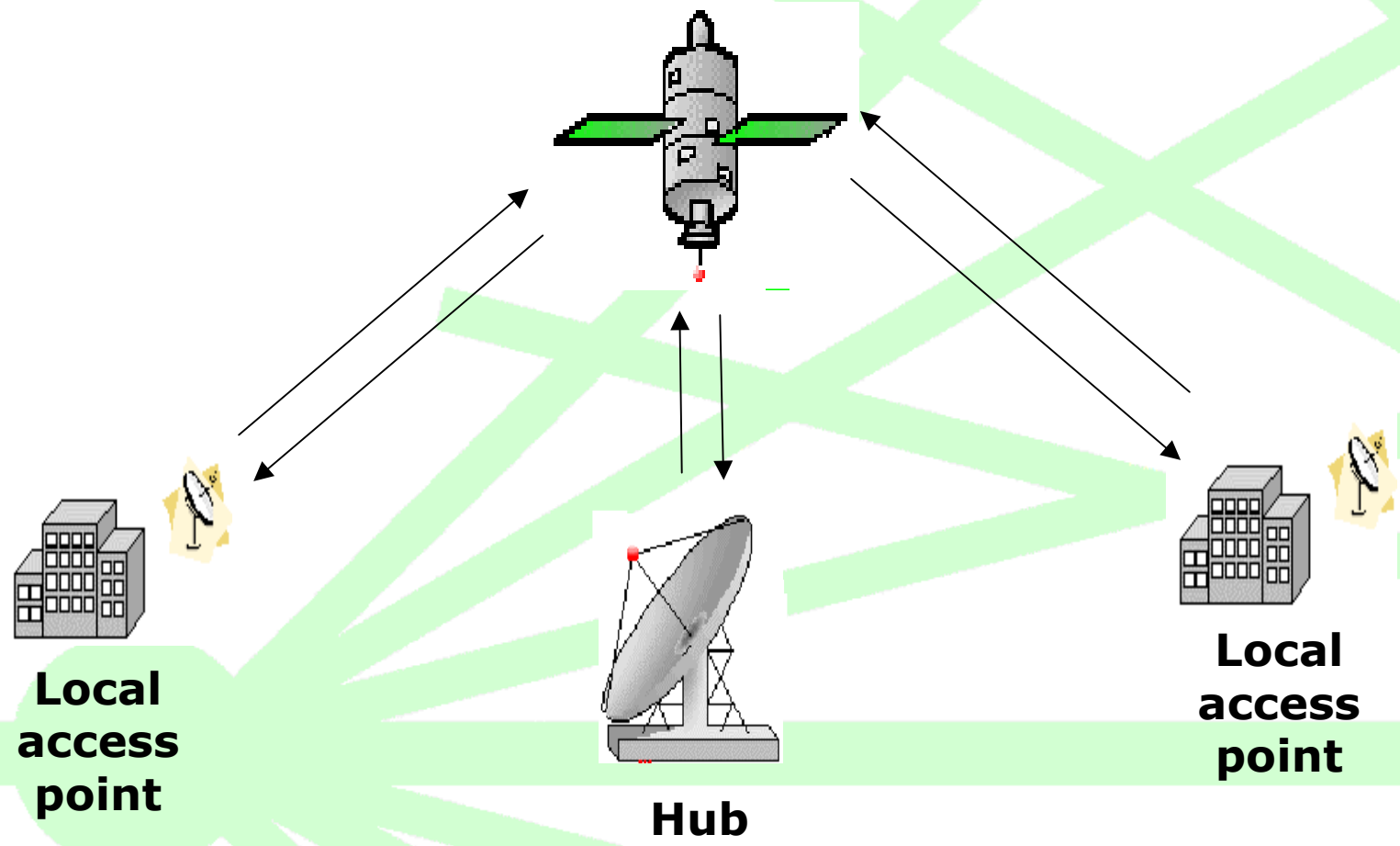
# An opportunity for the private market



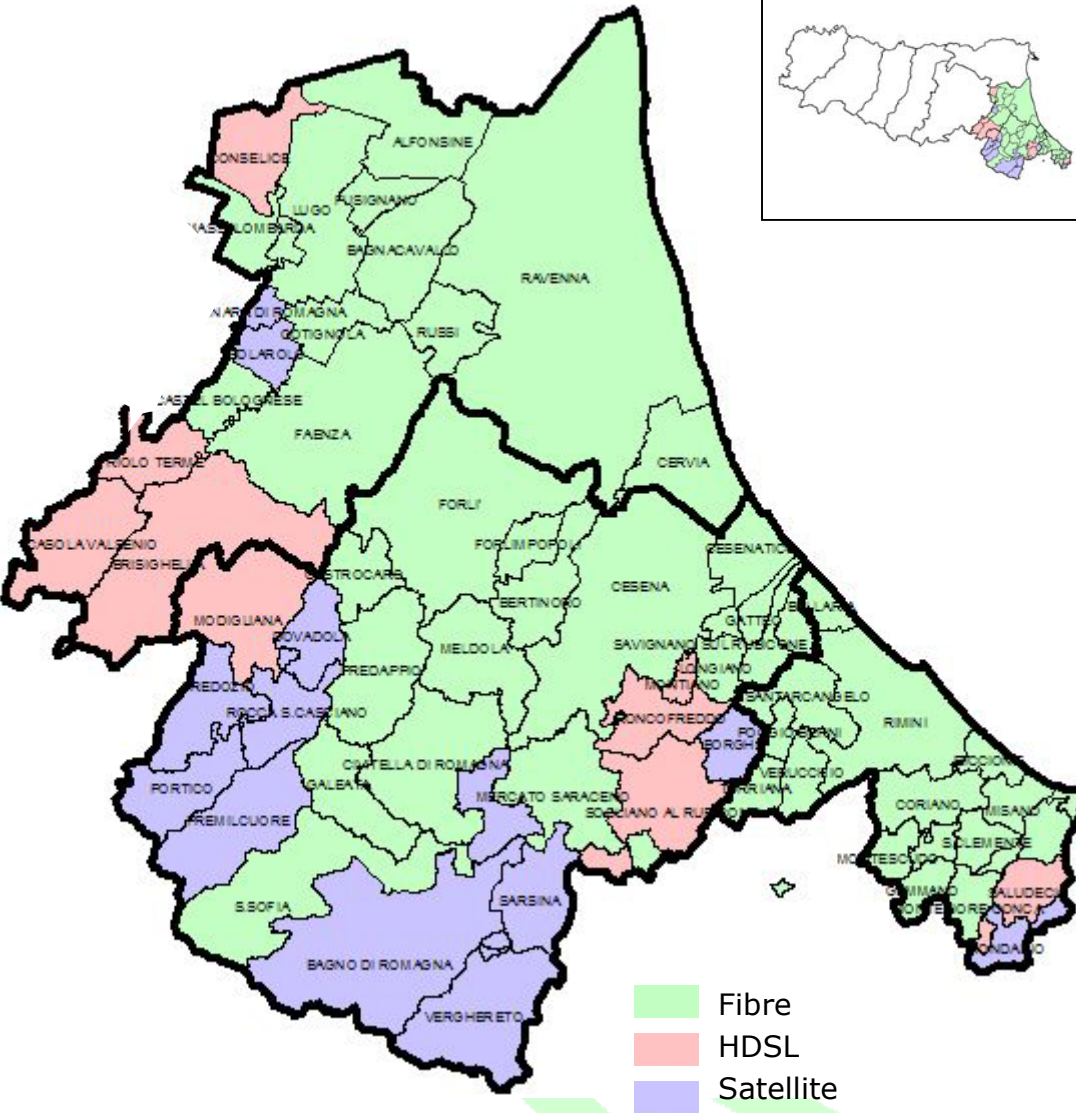
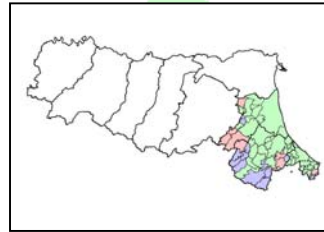
# Backbone infrastructure



# Satellite network architecture



# Technology spectrum: Romagna



## SATELLITE 3% pop.

Comune	
Forlì-Cesena	Bagno di Romagna
	Borghi
	Dovadola
	Portico e San Benedetto
	Premilcuore
	Rocca S. Casciano
	Sarsina
Tredozio	
Verghereto	
Ravenna	Bagnara di Romagna
	Solarolo
Rimini	Mondaino
	Montegridolfo

## FIBRE 93% pop.

Comune	
Forlì-Cesena	Bertinoro
	Castrocaro Terme
	Cesena
	Cesenatico
	Civitella
	Forlì
	Forlimpopoli
	Galeata
	Gambettola
	Gatteo
	Longiano
	Meldola
	Mercato Saraceno
	Predappio
	S. Mauro Pascoli
	Santa Sofia
	Savignano sul Rubicone

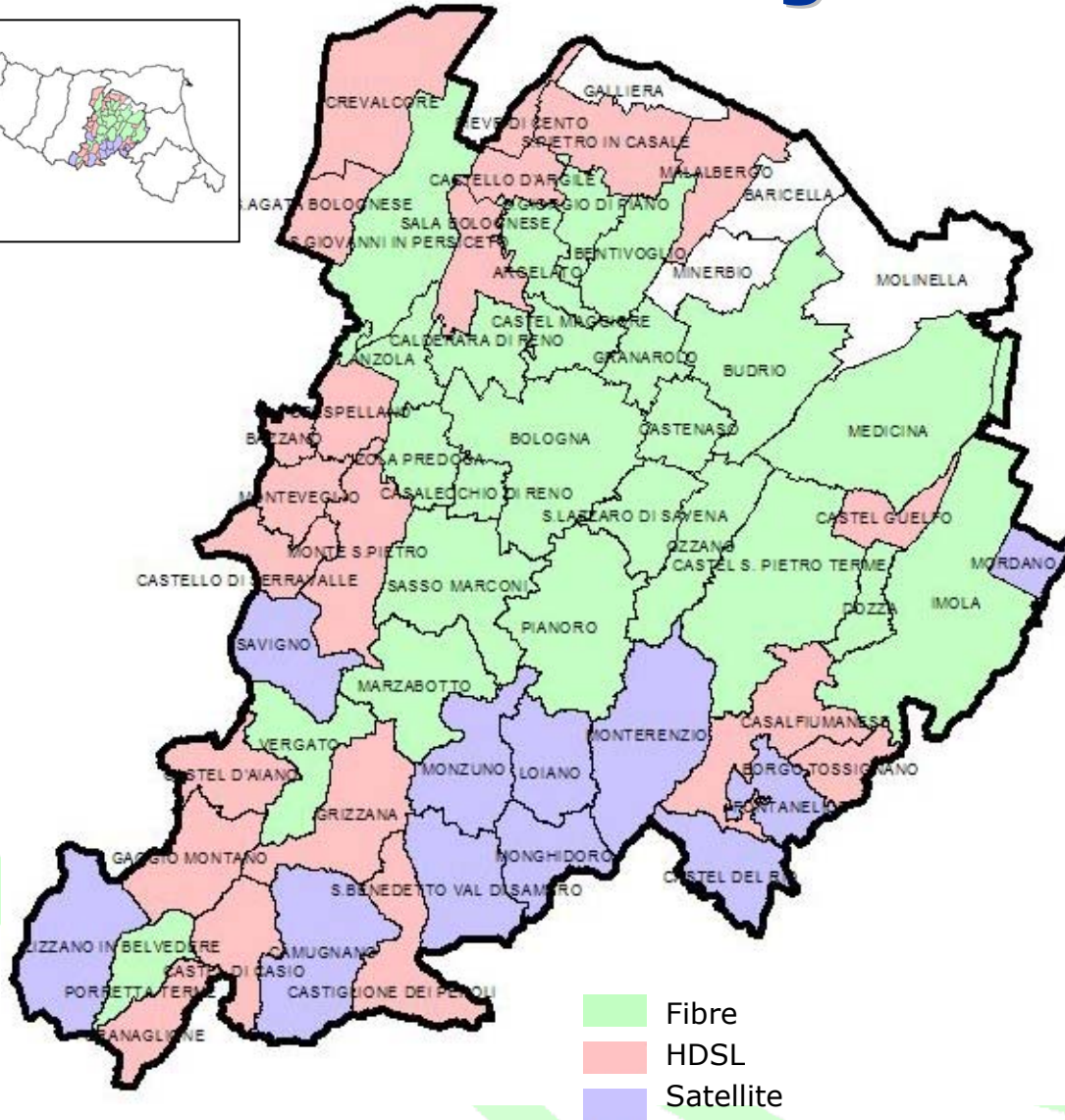
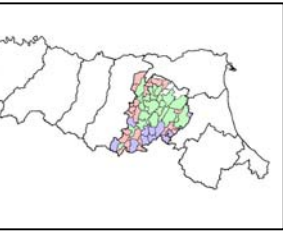
## xDSL 4% pop.

Comune	
Forlì-Cesena	Modigliana
	Montiano
	Roncofreddo
	Sogliano al Rubicone
Ravenna	Brisighella
	Casola Valsenio
	Conselice
	Riolo Terme
Rimini	Saludecio

Comune	
Ravenna	Alfonsine
	Bagnacavallo
	Castel Bolognese
	Cervia
	Cotignola
	Faenza
	Fusignano
	Lugo
	Massa Lombarda
	Ravenna
	Russi
S. Agata sul Santemo	

Comune	
Rimini	Bellaria
	Cattolica
	Coriano
	Gemmano
	Misano Adriatico
	Monte Colombo
	Montefiore Conca
	Montescudo
	Morciano di Romagna
	Poggio Berni
	Riccione
	Rimini
	S. Clemente
	S. Giovanni in Marignano
	Santarcangelo
	Torriana
	Verucchio

# Technology spectrum: Bologna



**SATELLITE**  
 8% pop.

Bologna	
Comune	
Bazzano	
Camugnano	
Castel del Rio	
Castello di Serravalle	
Crespellano	
Fontanelice	
Lizzano in Belvedere	
Loiano	
Monghidoro	
Monterenzio	
Monte San Pietro	
Montevoglio	
Monzuno	
Mordano	
S. Benedetto Val di Sambro	
Savigno	

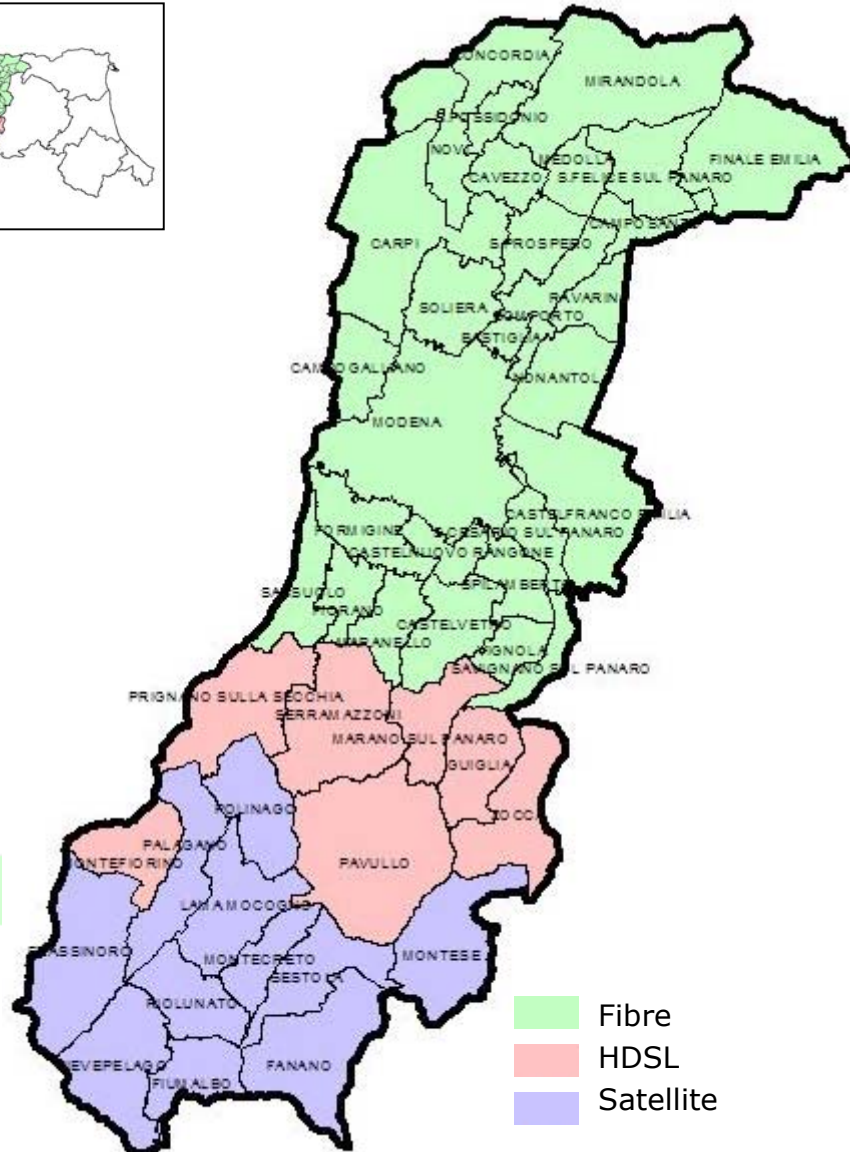
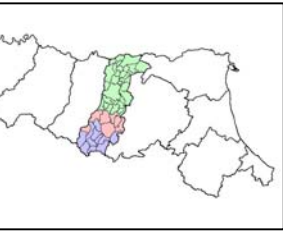
**FIBRE**  
 80% pop.

Bologna	
Comune	
Anzola	
Argelato	
Bentivoglio	
Bologna	
Budrio	
Calderara di Reno	
Casalecchio di Reno	
Castel Maggiore	
Castel S. Pietro Terme	
Castenaso	
Dozza	
Granaloro dell'Emilia	
Imola	
Marzabotto	
Medicina	
Ozzano nell'Emilia	
Pianoro	
Porretta Terme	
S. Giorgio di Piano	
S. Giovanni in Persiceto	
S. Lazzaro di Savena	
Sasso Marconi	
Vergato	
Zola Predosa	

**xDSL**  
 9% pop.

Bologna	
Comune	
Borgo Tossignano	
Casalfiumanese	
Castel d'Aiano	
Castel di Casio	
Castel Guelfo di Bologna	
Castello d'Argile	
Castiglione dei Pepoli	
Crevalcore	
Gaggio Montano	
Granaglione	
Grizzana Morandi	
Malalbergo	
Pieve di Cento	
Sala Bolognese	
San Pietro in Casale	
Sant'Agata Bolognese	

# Technology spectrum: Modena



**SATELLITE**  
4% pop.

Modena	
Comune	
Fanano	
Fiumalbo	
Frassinoro	
Lama Mocogno	
Montecreto	
Montese	
Palagano	
Pievepelago	
Polinago	
Riolunato	
Sestola	

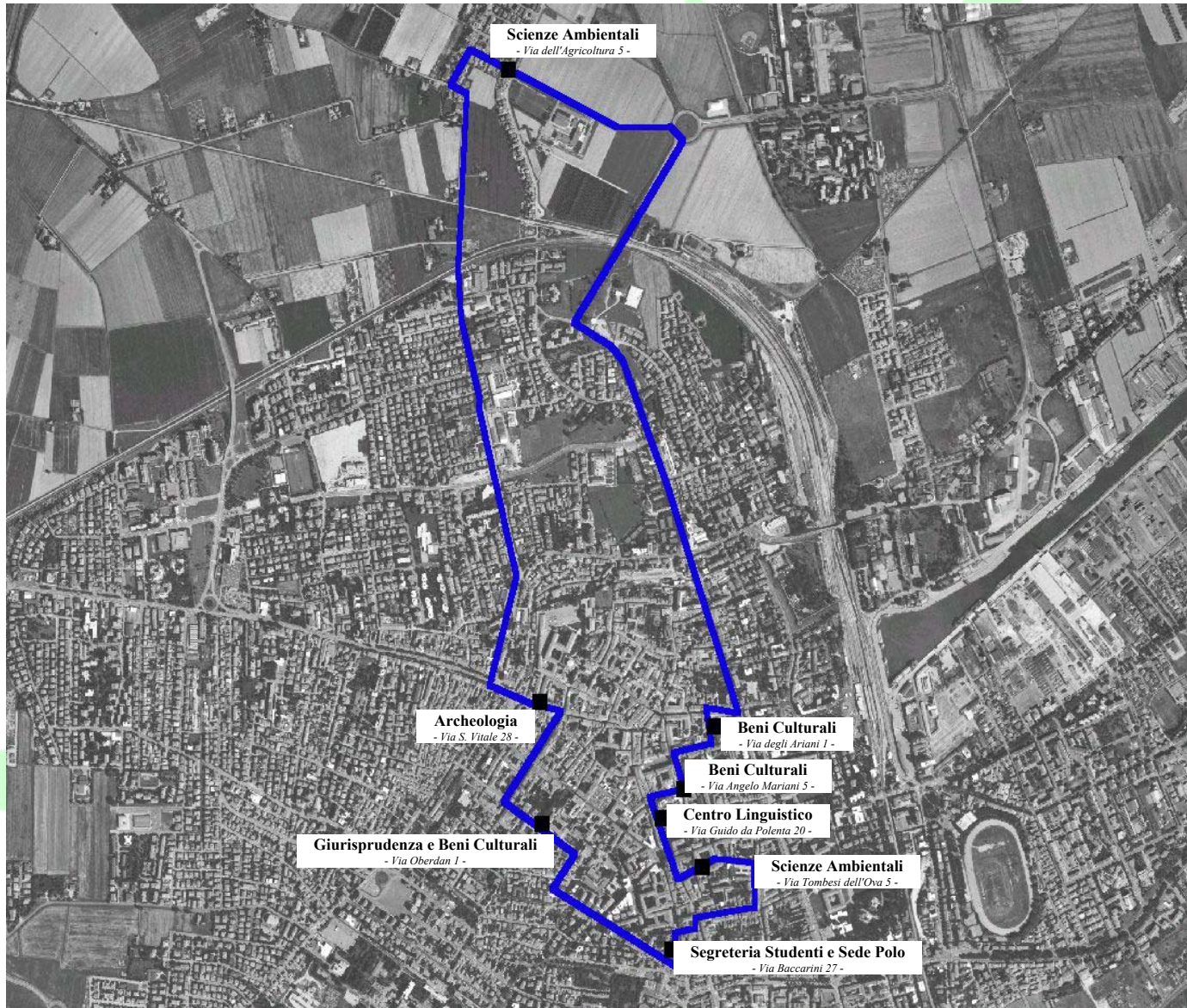
**xDSL**  
6% pop.

Modena	
Comune	
Guiglia	
Marano sul Panaro	
Montefiorino	
Pavullo nel Frignano	
Prignano sulla Secchia	
Serramazzone	
Zocca	

**FIBRE**  
90% pop.

Modena	
Comune	
Bastiglia	
Bomperto	
Campogalliano	
Camposanto	
Carpi	
Castelfranco Emilia	
Castelnuovo Rangone	
Castelvetro	
Cavezzo	
Concordia sulla Secchia	
Finola Emilia	
Fiorano Modenese	
Formigine	
Maranello	
Medolla	
Mirandola	
Modena	
Nonatola	
Novi di Modena	
Ravarino	
San Cesario sul Panaro	
San Felice sul Panaro	
San Possidonio	
San Prospero	
Sassuolo	
Savignano sul Panaro	
Soliera	
Spilamberto	
Vignola	

# Ravenna MAN



# Technology spectrum at a glance

TECH	municipalities	%	area (km <sup>2</sup> )	%	population	%
FIBRE	99	57%	6.460	57%	2.220.000	88%
SAT	40	23%	2.430	22%	125.000	5%
xDSL	32	20%	2.020	21%	165.000	7%
<b>TOT</b>	<b>171</b>		<b>10.910</b>		<b>2.510.000</b>	

# Infrastructure figures

**(warning:** figures are estimates and therefore subject to changes)

Network segment	Length (km)	Cost (M€)
Backbone	566	5.3
Distribution	478	14.0
<b>Totals</b>	<b>1.044</b>	<b>19.3</b>

utility companies will invest about **x 2**

# Network service figures

(**warning**: figures are estimates and therefore subject to changes)

<b>IP bandwidth</b>	<b>23.1 Gbps</b>
<b>Internet bandwidth</b>	<b>123 Mbps</b>
<b>100baseTx ports</b>	<b>314</b>
<b>1000baseLx ports</b>	<b>36</b>
<b>IP addresses</b>	<b>4,976</b>
<b>AO&amp;M cost/yr</b>	<b>6.6 M€</b>

# Primary network services

- **On-net IP connectivity**
  - » municipalities over 60,000 people: 1 Gbps
  - » other municipalities: 100 Mbps
- **Internet connectivity**
- **Layer 2 and 3 VPN services**
- **Network maintenance and support**
- **Network administration, operations, and management**
  - » Network Operations Centre
  - » Customer Care
  - » Help Desk

# Additional network services

- **Additional on-net IP connectivity bandwidth**
- **Additional Internet connectivity bandwidth**
- **Remote ports from local access points to local PA premises**
- **Security services (*firewall* and *proxy*)**
- **Voice**

# Control centre

- **Multi-operator network: an option**
- **Check SLA with each operator**
- **Control periodic reports from each operator**
- **Set guidelines for security and audit systems and practices**

# Implementation schedule (eastern section)

- **Network completion by 2005**
- **Delivery and certification of fibre optics network segments in batches from Sep-03 to Dec-05**
- **Delivery and certification of network services on fibres in batches from Sep-03 to Dec-05**
- **Delivery and certification of satellite and HDSL links by Dec-04**

- **Against current services**

- » emerging e-government services require more bandwidth than currently available
- » a massive upgrade of capacity would be needed and increase costs significantly

- **Against commercial offerings**

- » > 80% cheaper than highest performance and widely available service (4 Mbps)
- » 100 Mbps / 1 Gbps connectivity available only in some urban areas

- **On the territory**

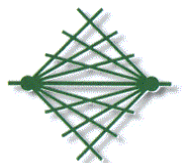
- » broadband services available where they would not have been without the regional administration initiative: **competitiveness**
- » a strong action against the **digital divide**

- **On the public administration**

- » improvement of the quality and extensions of public services to citizens and businesses (strengthening both back-office and front-office links)
- » optimisation and centralisation of telecommunications costs

# Conclusions

- **A private network for local PA in Emilia-Romagna will be completed (eastern section by 2005)**
- **Services will be available starting from early 2004**
- **The local community (citizens, businesses, and public administration) will benefit from the infrastructure: access to broadband services will be facilitated**



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Thank you for your attention!  
Any questions?