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Nokia Networks

Expand the human possibilities of the connected world

Celtic-Plus Proposers Day
7 May, 2015, Oulu, Finland
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Technology disruption transforms business and lives

Estimated 2025
Enterprise IT spend

2.3Tn EUR

Connected devices
in 2025 45Bn of
which are M2M

31Bn

Compute power of
Amazon's cloud
against 14
competitors

5x

Estimated global
spend in the
Internet of Things

3.8Tn EUR

Estimated
number of mobile
devices held per
person by 2025

6+

Percentage of
automated Services
without human
intervention by
2025

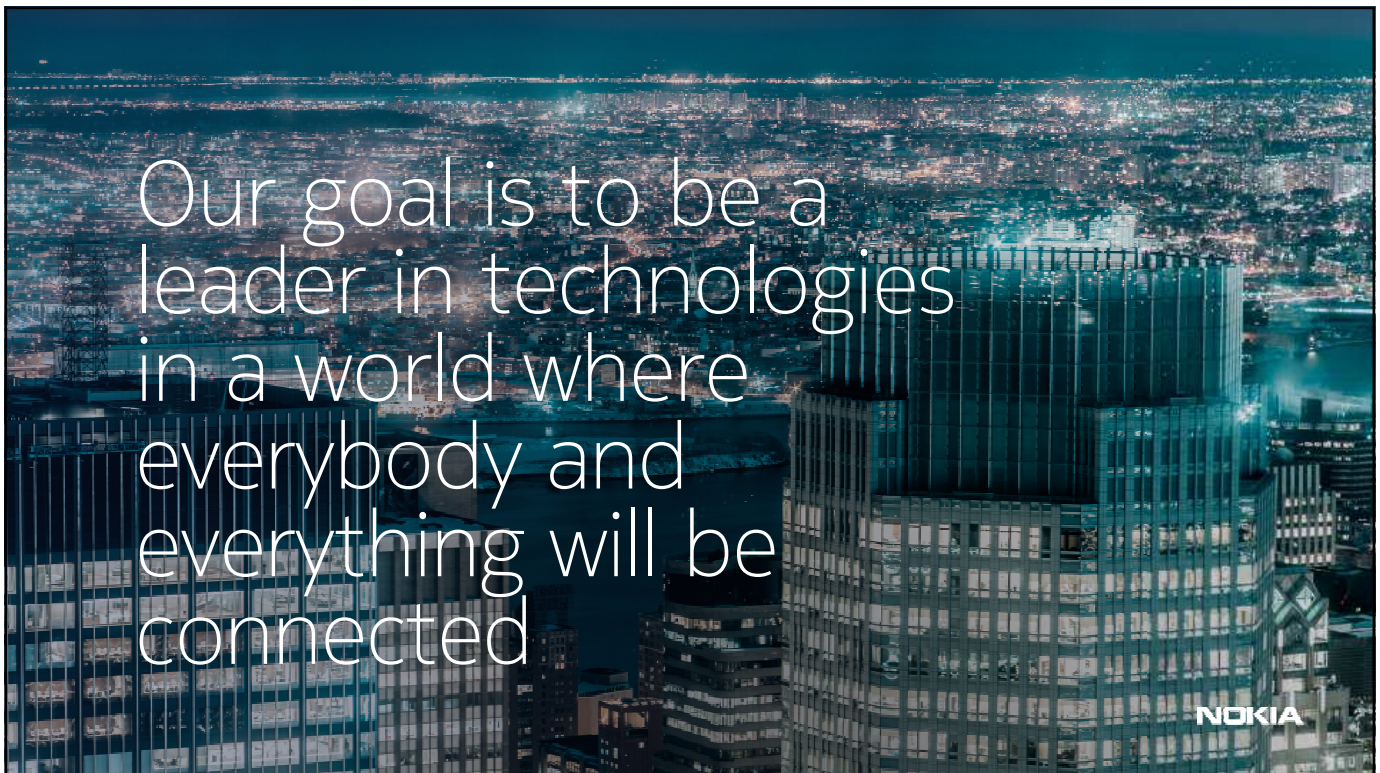
>80%

Estimated mobile
operator spend on
Network and IT
Infrastructure in
2025

244Bn EUR



In a business that requires a change



Our goal is to be a leader in technologies in a world where everybody and everything will be connected

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A change we embrace



1871

Today



Only opening up expands
the business for all players

Come in, we're
OPEN

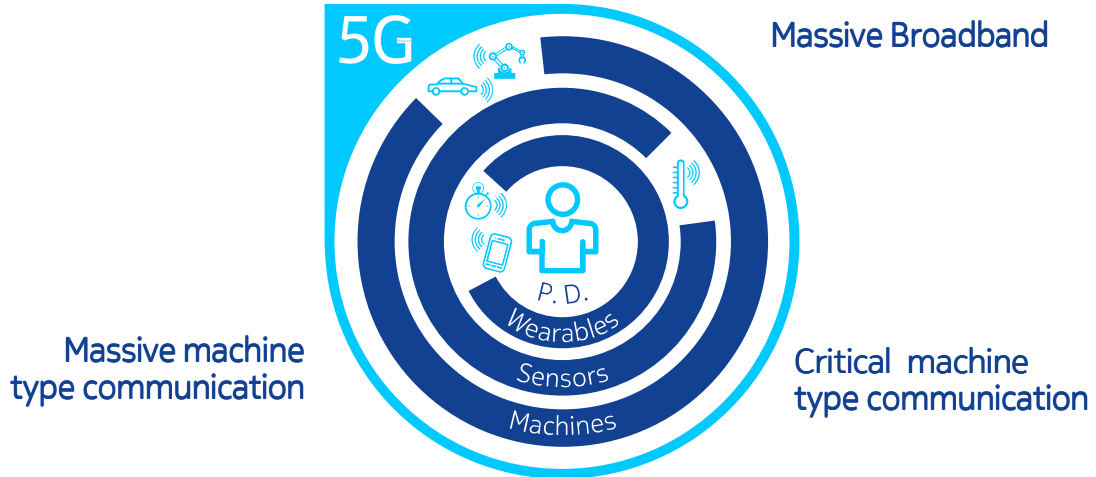
Agility
Openness
Innovation
Expertise

Hours Of Operation
Monday - Friday 7am - 3pm
Saturday - Sunday 7am - 4pm



5G for people and things

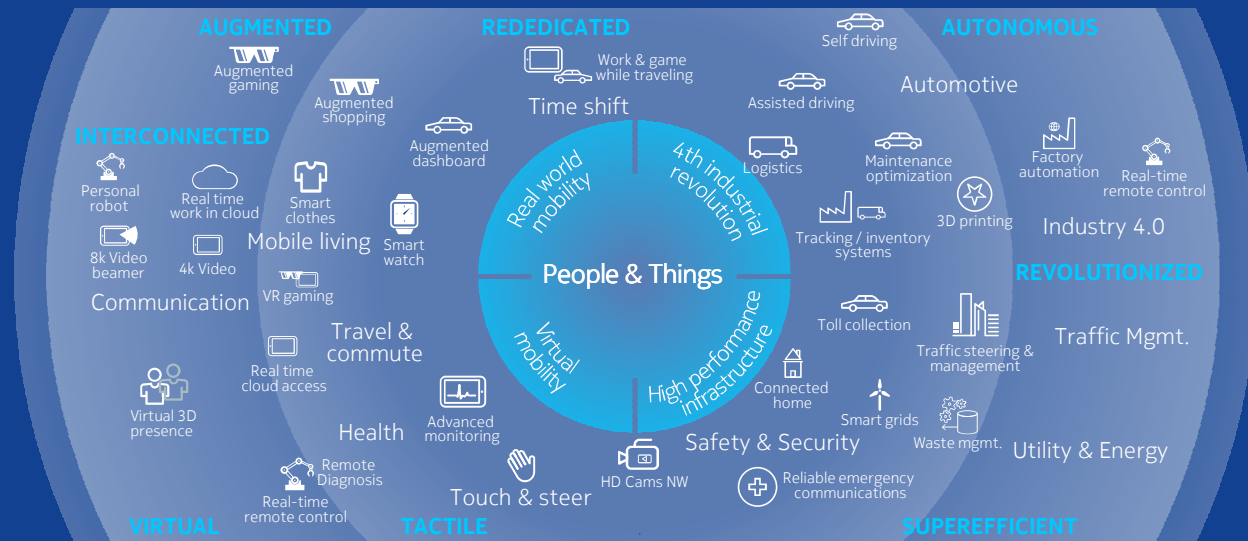
Expanding the human possibilities of cellular technology



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Explosion of possibilities announcing new performance levels of people and things

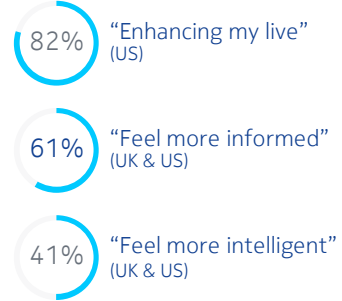
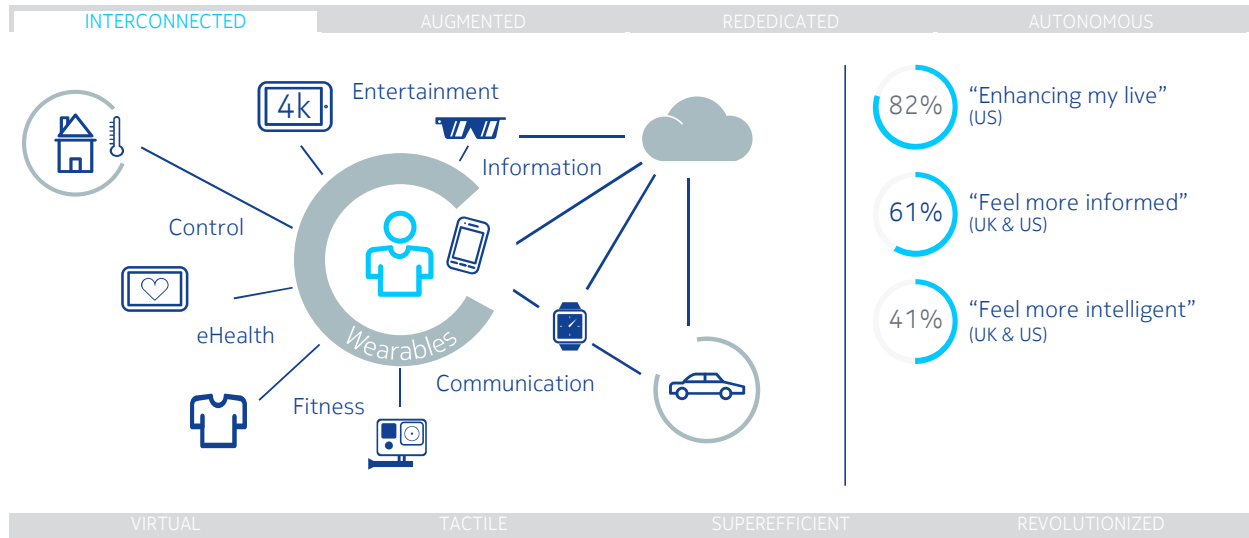


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human possibilities

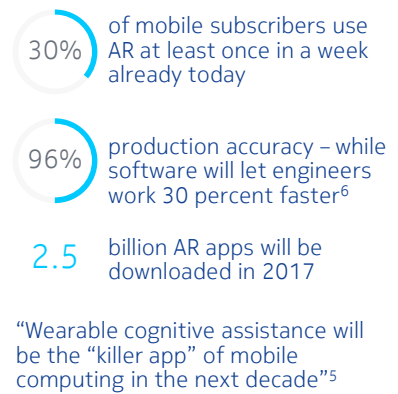
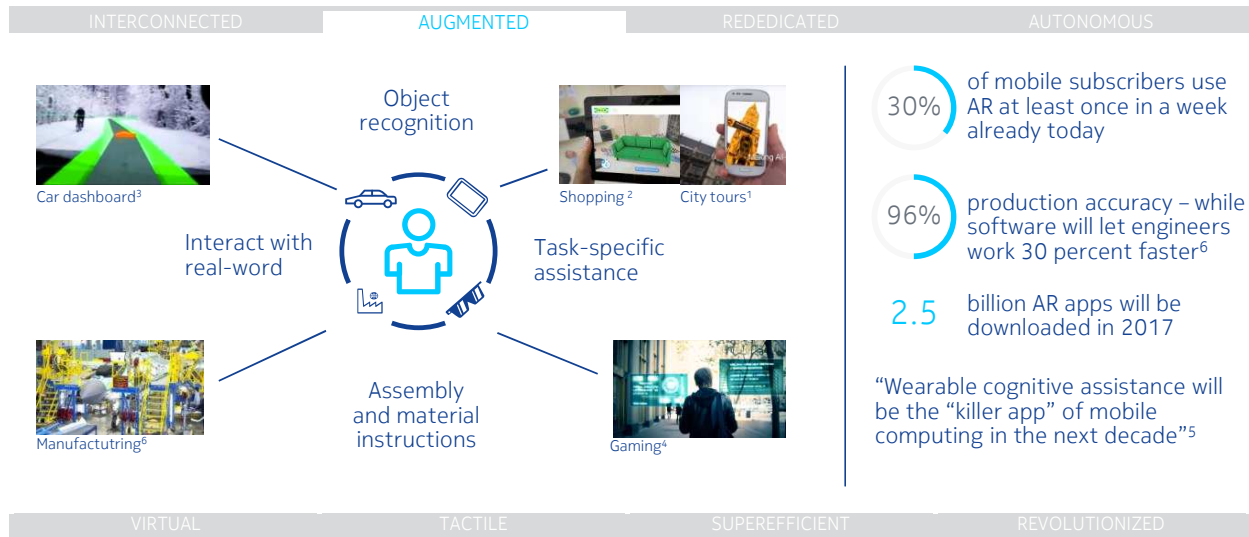
Your application environment following you anywhere



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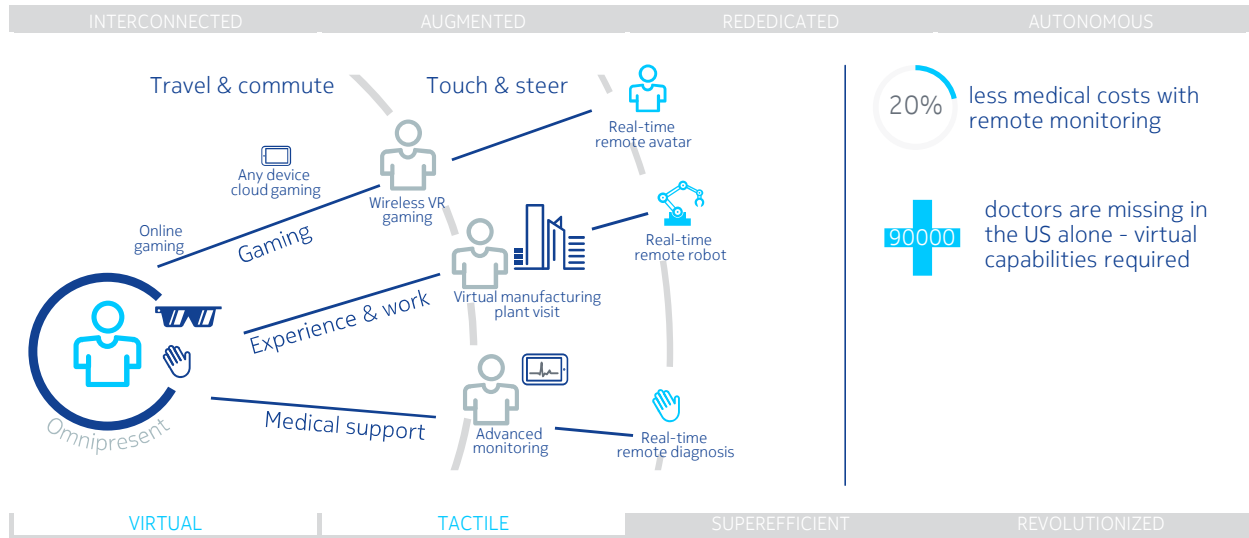
Enhancing perception of reality in real-time



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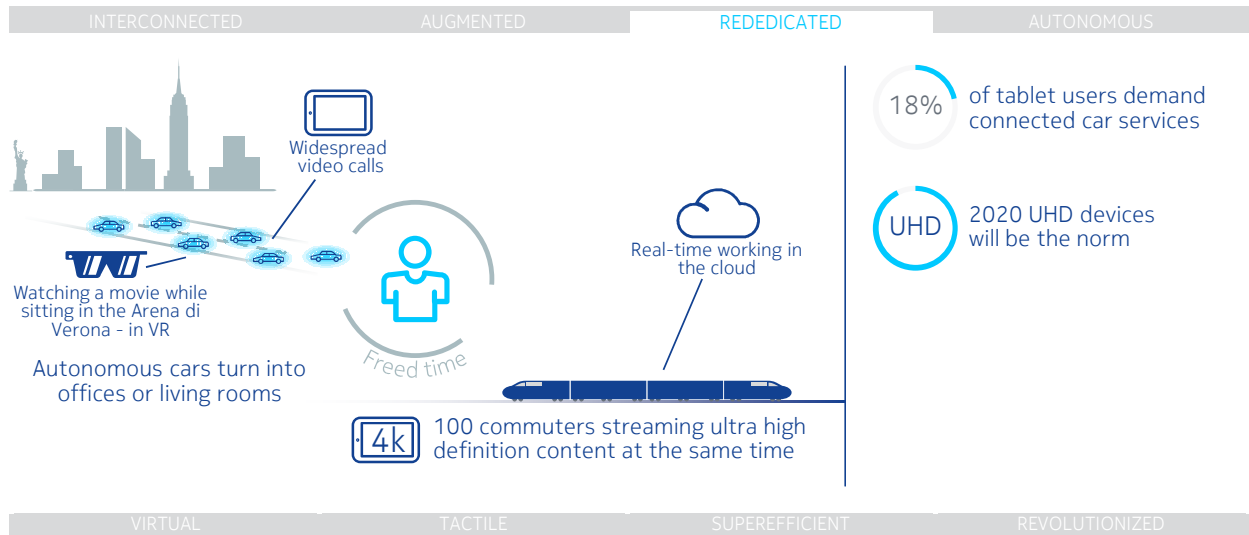
Virtually present at any place while interacting with real world



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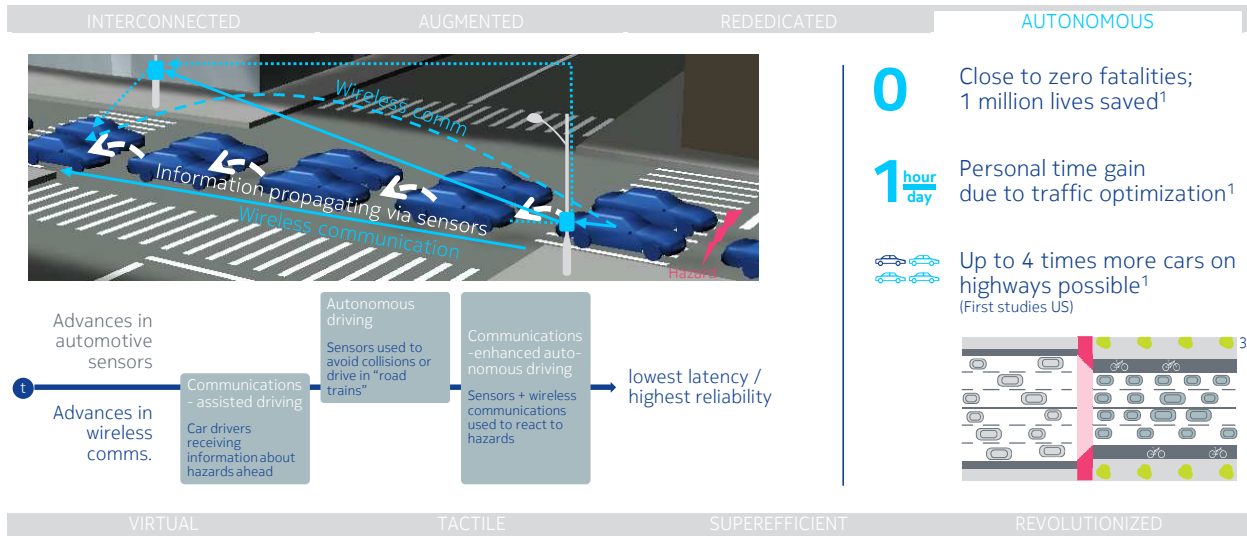
Rededicate commuting time for work & entertainment



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Transforming urban space: autonomous vehicles

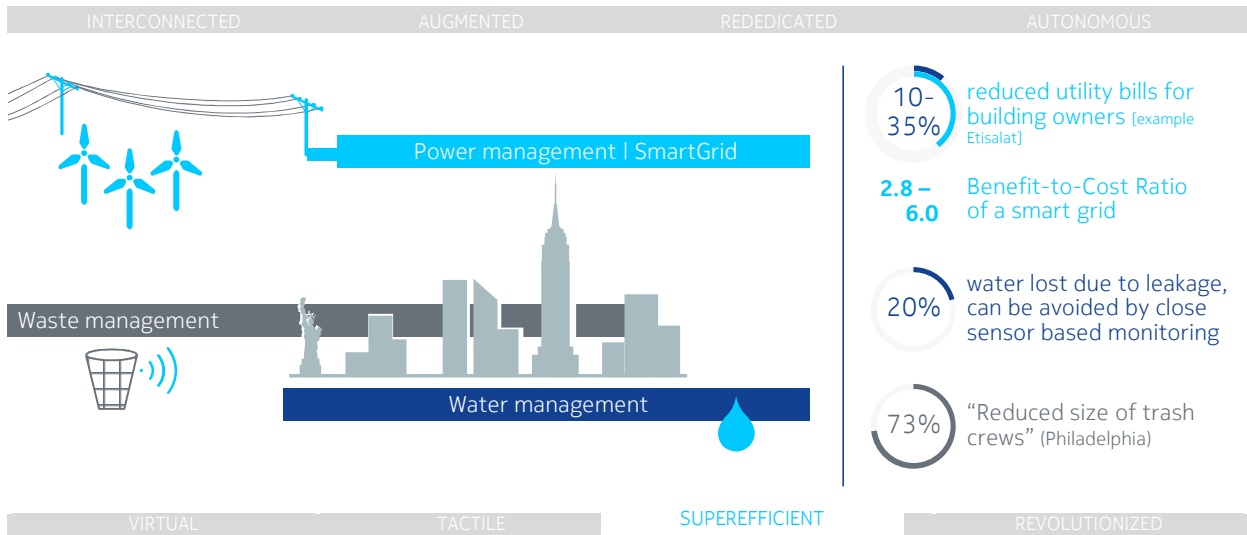


- 0** Close to zero fatalities; 1 million lives saved¹
- 1 hour day** Personal time gain due to traffic optimization¹
- Up to 4 times more cars on highways possible¹ (First studies US)

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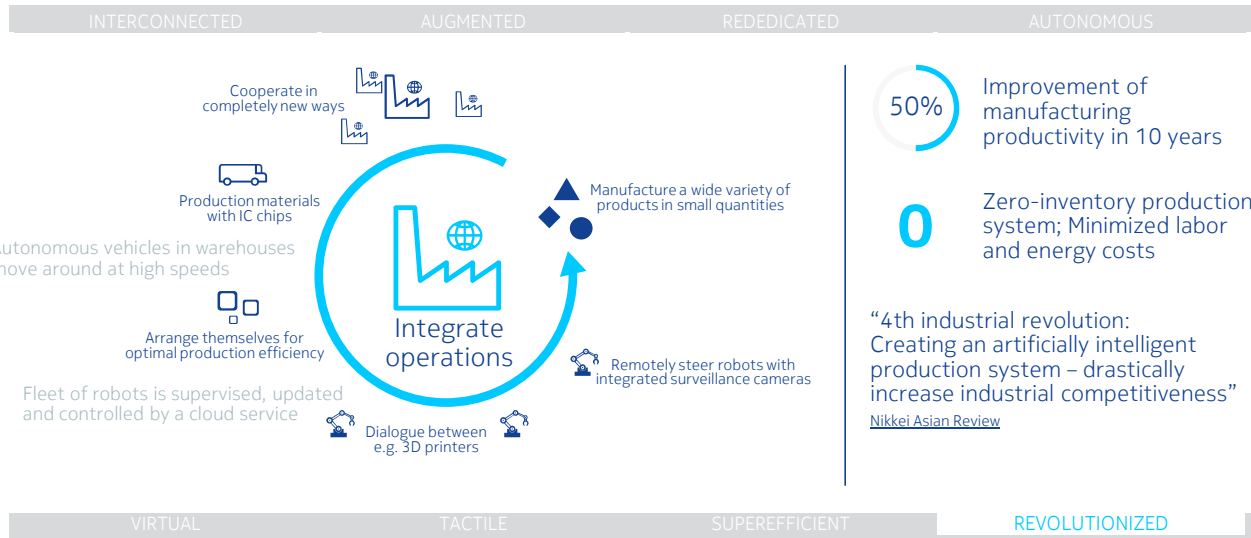
Transforming urban space: superefficient infrastructure



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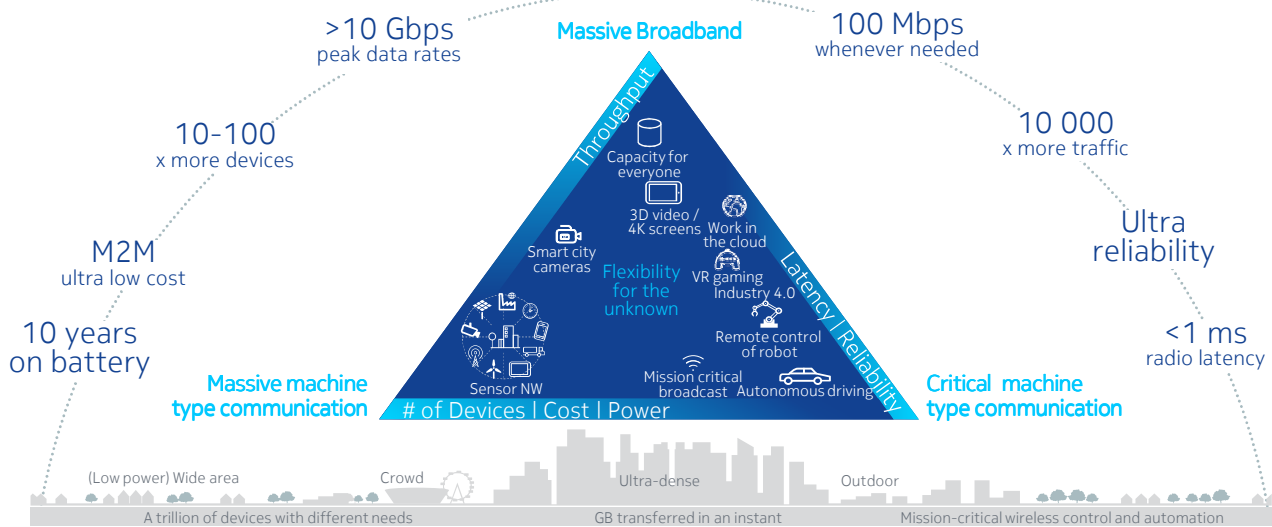
4th industrial revolution: create an "artificially intelligent" production system



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Introducing extreme range of requirements



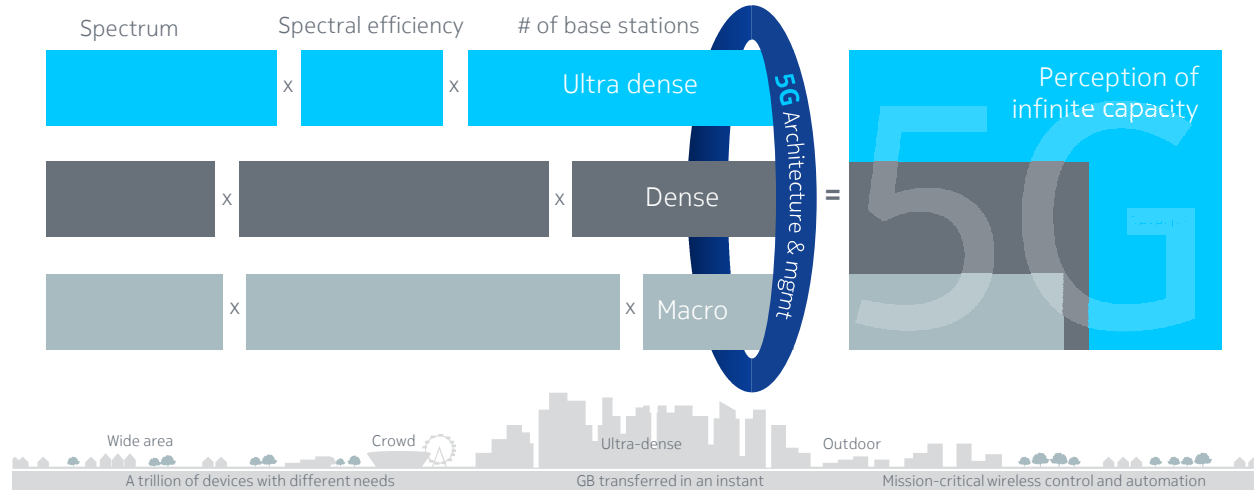
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human possibilities

Networks to become much denser

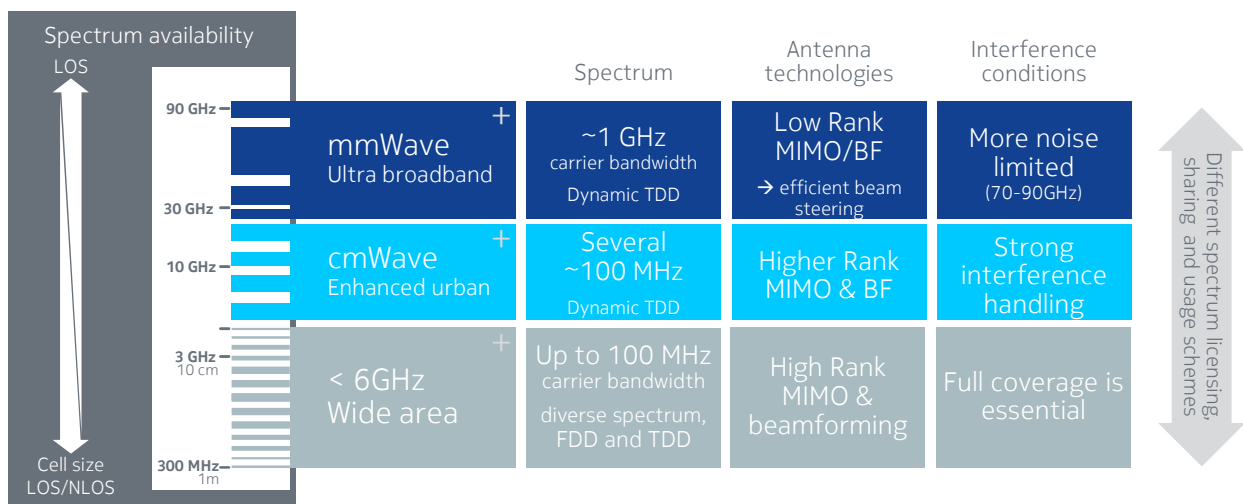
5G flexibly integrates multiple air interfaces and layers



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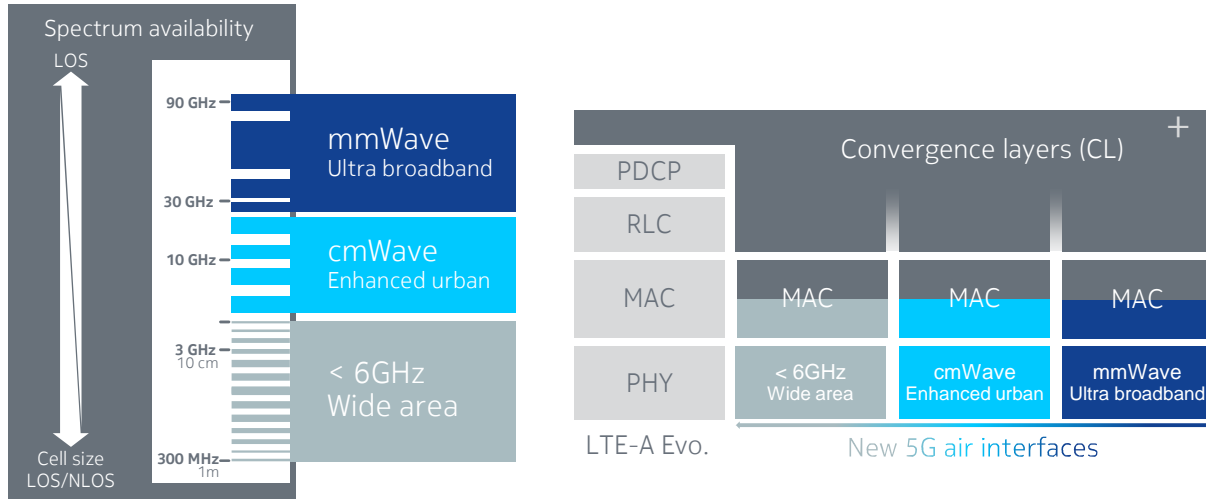
5G is to enable above 6 GHz access & optimize below 6 GHz access



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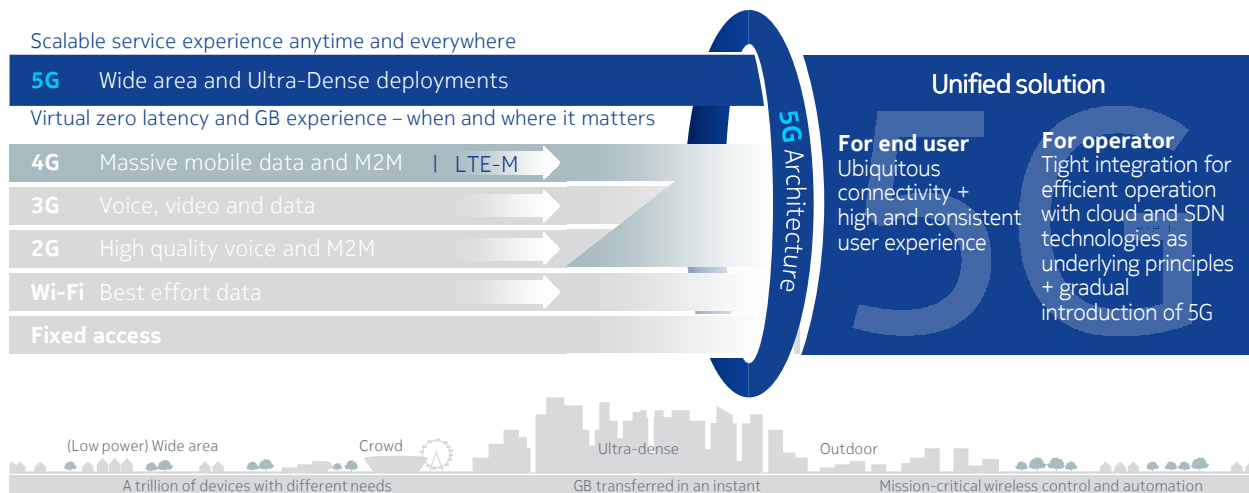
Frequency-specific air interfaces managed as one system



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A symbiotic integration of novel and existing access technologies Nokia 5G system vision



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Architecture

What is needed to make 5G a true global success?

Growth and enabler of societal innovation

Flagship of Digital Agenda	Cross region collaborative research and pre-consensus	Market driven competition and consolidation	Legislation on Net Neutrality	Business models <ul style="list-style-type: none"> Connectivity Apps enabling & management Data brokerage & analytics will have to evolve
Drive global standardization	More globally harmonized spectrum (for LTE and 5G)	Data Protection for information centric networks	Fair rules for standard essential patents	



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overview activities

Connecting things is a different business

	Connection volumes 2020	ARPC 2015	Churn	Data pricing	Connectivity	Security
Connecting people	11 billion	High Ø \$30/month	High ~ 35% often more	Based on volume of data	best effort, QoE mgmt.	Important
Connecting things	Tens of billions	Low Ø \$3/month	Low ~10% or less	Based on value of data	SLAs Reliability Criticality	Critical

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overview activities



5G as a platform for innovation



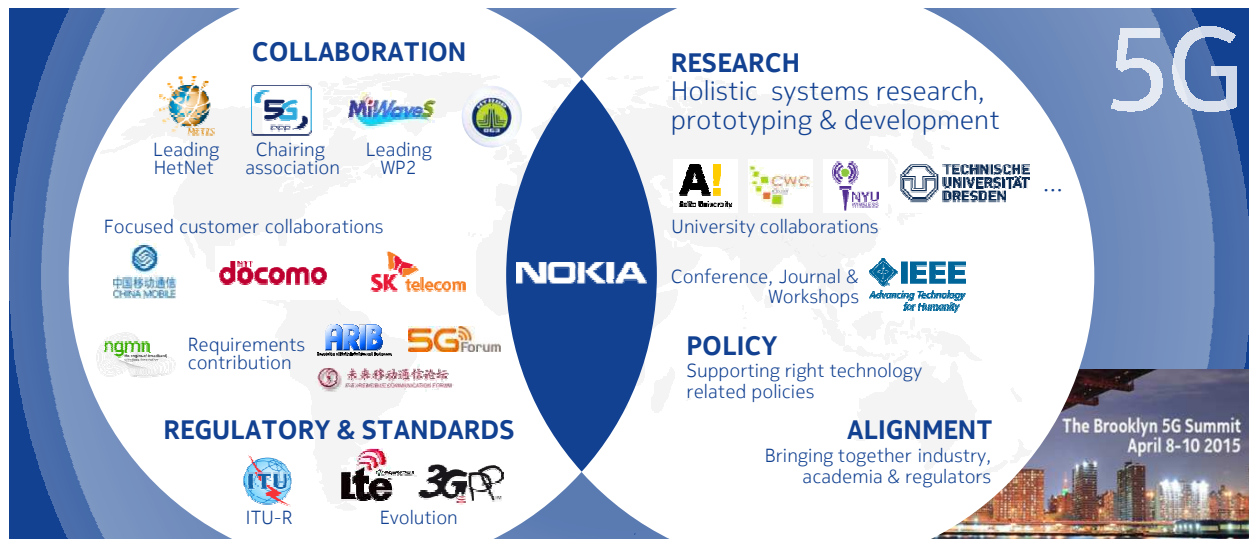
Platform which allows others to innovate and apply 5G to improve life, business and society

Useful for every industry, every vertical, every human, every machine and every thing

Finnish 5th Gear 5G test network project in Oulu

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Nokia active on 5G



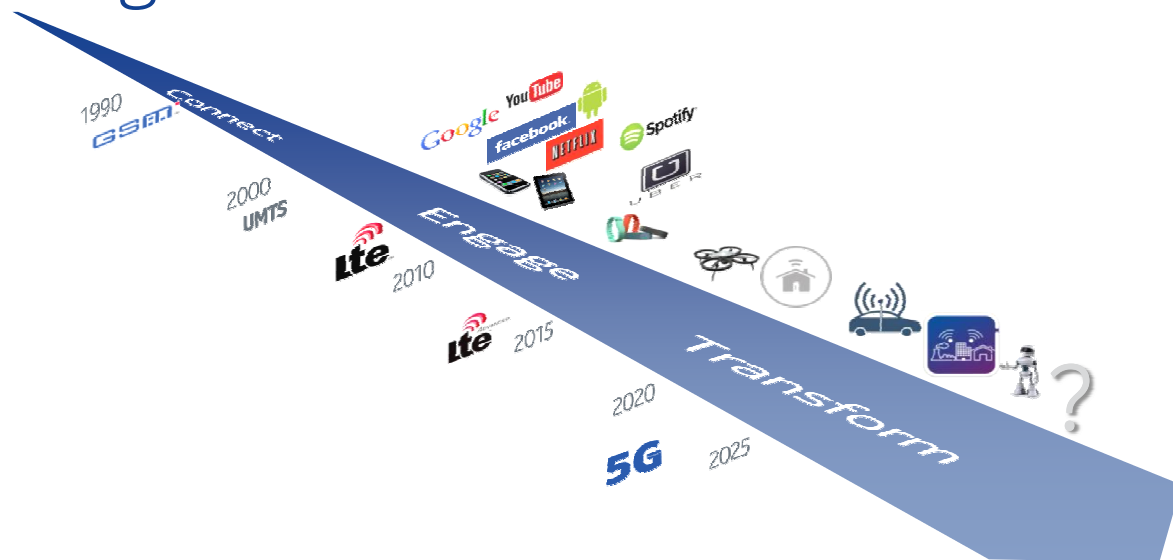
→ find regular updates under www.networks.nokia.com/innovation/5G

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main | symbiotic

Imagine

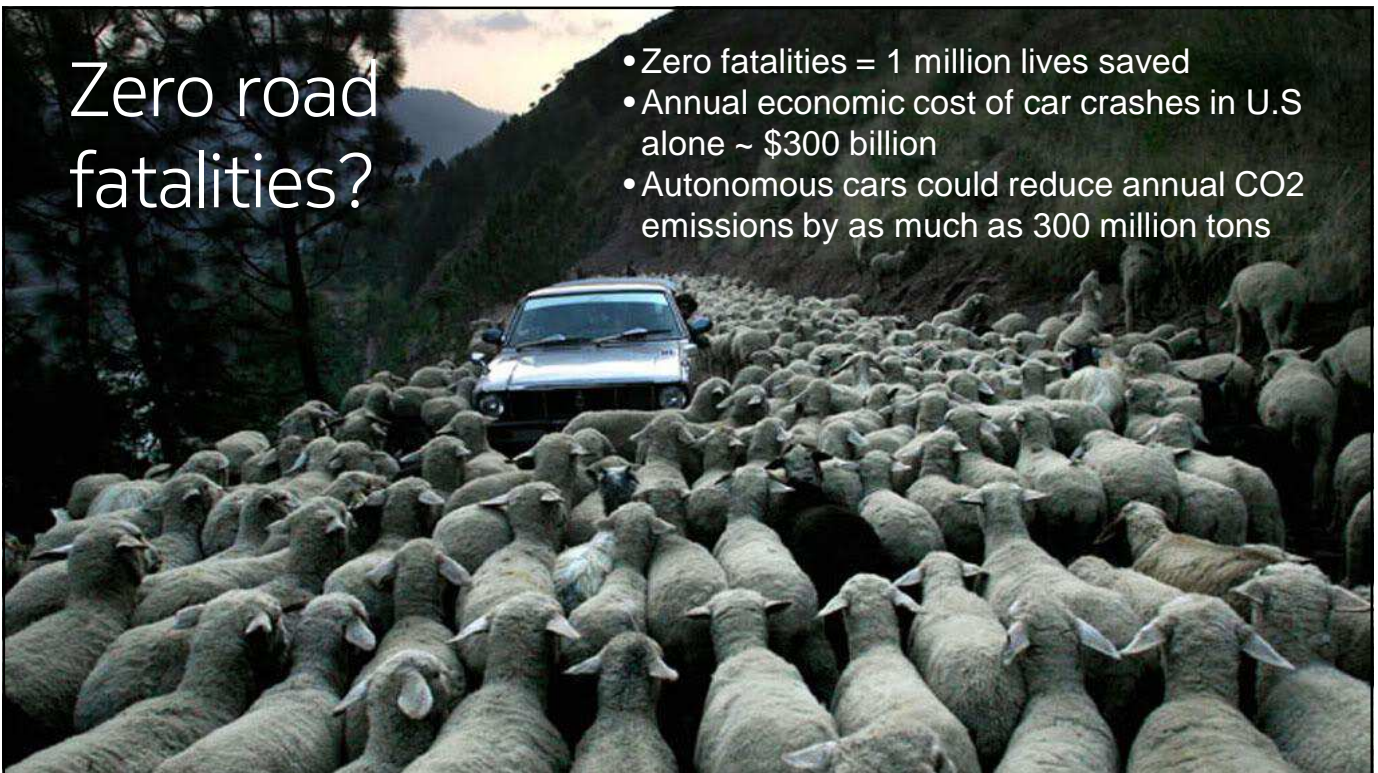


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Zero road fatalities?

- Zero fatalities = 1 million lives saved
- Annual economic cost of car crashes in U.S alone ~ \$300 billion
- Autonomous cars could reduce annual CO2 emissions by as much as 300 million tons



Zero loss in water distribution?



20% water lost due to leakage today
= 71 billion gallons lost everyday
= Daily water usage in California, Texas and Ohio Combined

Always contain the spread of
communicable diseases...
never cross a boundary?

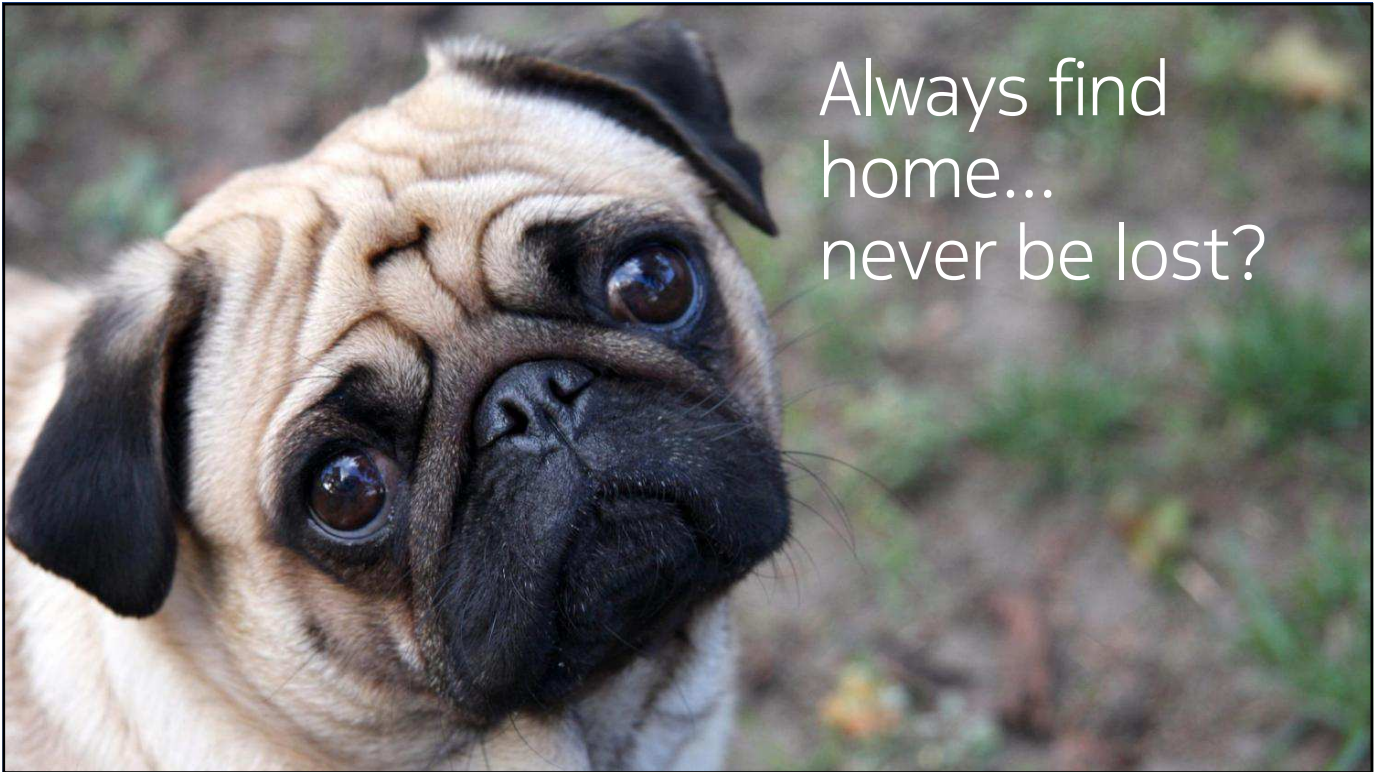


Give back 2hrs
everyday...
never be in a rush?

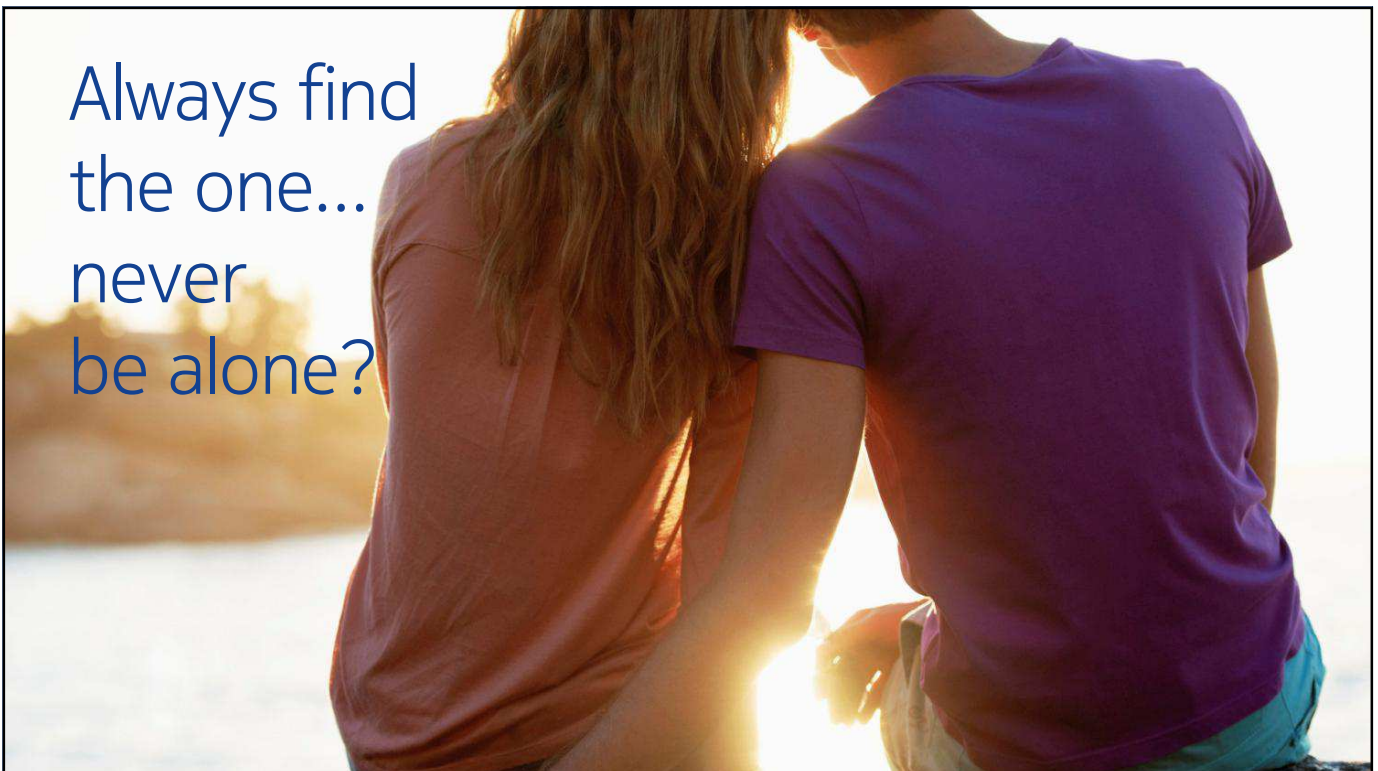


Always speak the local language ...
never be lost in translation?





Always find
home...
never be lost?



Always find
the one...
never
be alone?

Let's live in the future,
then build
what's missing

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