Mobile Opportunistic Traffic Offloading

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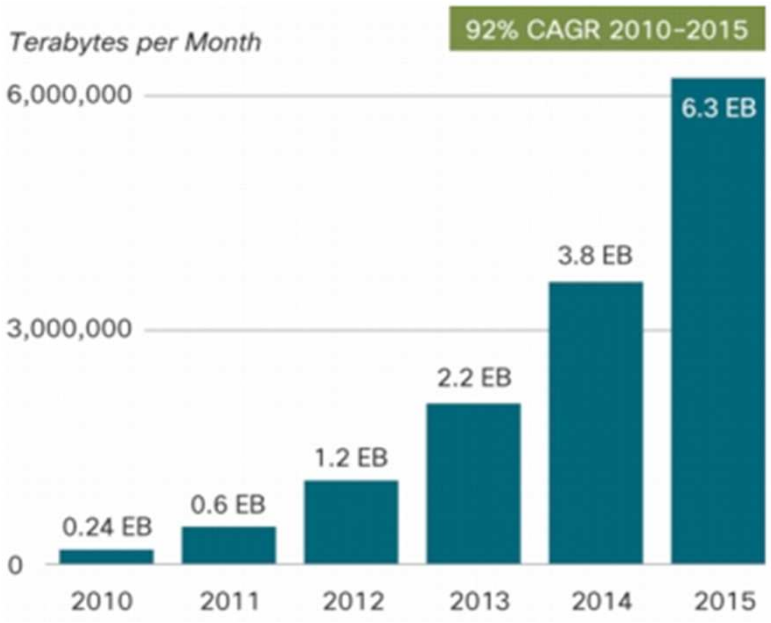
Mobile Challenge



Global Mobile Data Forecast

c Cisco VNI Mobile, 2011

Exponential traffic demand

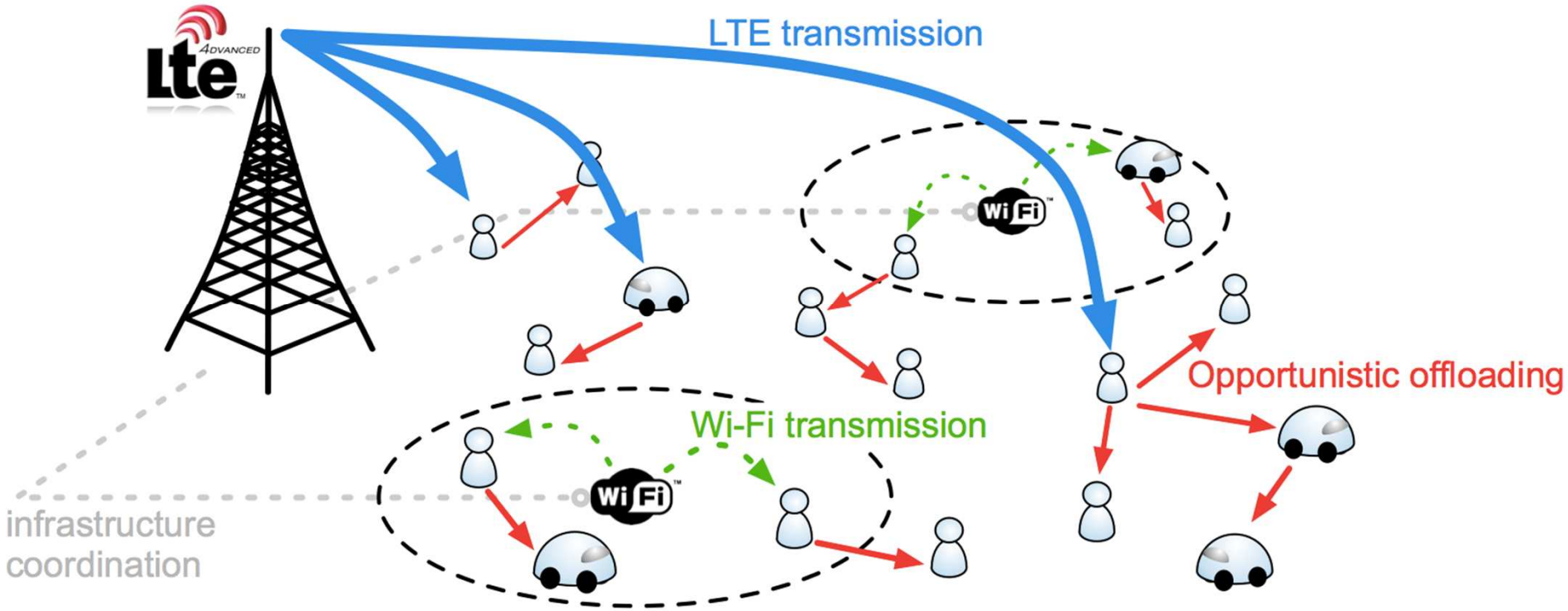
Limited Bandwidth for 4G deployments

Bounded by Shannon Theorem

Slowed by deployment costs

It is expected that the amount of traffic generated by 4G users will be about one order of magnitude larger than the bandwidth operators will be able to deliver

Mobile Opportunistic Traffic Offloading



Strategies for offloading traffic from the infrastructure (the LTE access network) on to alternate radio resource networks (the Wi-Fi links)

Main challenges

Fundamental challenges

- Understanding mobility and contact opportunities
- Capacity enhancements through operator-controlled offloading on mobile terminals
- Green savings

Practical challenges

- Efficient protocols for traffic offloading
- Coordinating offloading strategies
- Distributed trust and security

MOTO project

- **3 year European project**
  - Nov 2012 - Oct 2015

TCS: Thales Communications & Security S.A.
CNR: Consiglio Nazionale delle Ricerche
INNO: Asociacion de Empresas Tecnologicas Innovalia
UPMC: Université Pierre et Marie Curie
FON: FON Wireless Ltd
AVEA: AVEA Iletişim Hizmetleri A.Ş.
CRF: Centro Ricerche FIAT SCPA
INT: INTECS Informatica e Tecnologia del Software S.P.A.

To design an integrated operator-managed offloading system

- *Assess how to integrate the MOTO functions for mobile terminal management, trust, flow and session management. In an operator/ 3GPP architecture*

To design combined offloading algorithms.

- *How to accomodate heterogeneous classes of services, including time-constrained flows in unicast or multicast modes, to increase overall capacity of the system.*

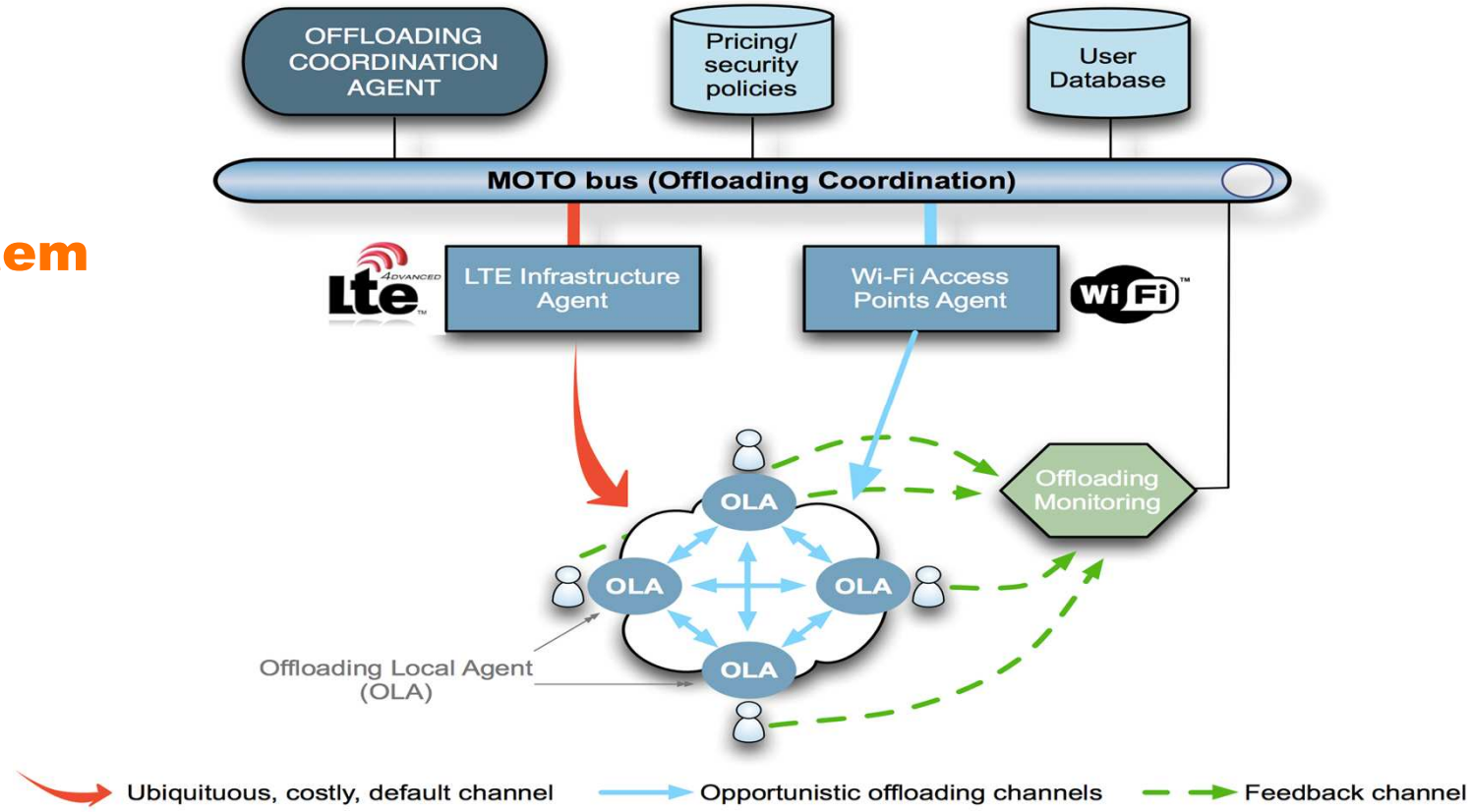
To characterise the capacity benefits of the system

- *KPI: how to take into account mobility patterns, traffic features, and green savings constraints that are typical of the use cases identified in the project (home, smart city, vehicular). In a theoretical capacity analysis*

System architecture

New system

for



New business opportunities

- new services based on in vehicle e-call platform
- new data sharing strategies for operators
- new enhancements to boxes and devices

Q&A session

THANKS!

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Objectives

Objective 1 (*To design an integrated operator-managed offloading system*).

- *The MOTO system design integrates offloading within the 3GPP (3G/4G) and wireless broadband Internet infrastructures and standards. This new design adds complementary functions for mobile terminal management, trust, flow and session management.*

Objective 2 (*To design combined offloading algorithms*).

- *Offloading takes advantage opportunistically both of AP connectivity and terminal-to-terminal communication opportunities. The algorithms will support heterogeneous classes of services, including time-constrained flows in unicast or multicast modes, to increase overall capacity of the system.*

Objective 3 (*To characterise the capacity benefits of the system*)

- *Theoretical studies will take into account mobility patterns, traffic features, and green savings constraints that are typical of the use cases identified in the project (home, smart city, vehicular).*

Objectives

Objective 4 (*To perform fine-grained large scale evaluation*).

- *The MOTO project will contribute to the development of an open source offloading simulation library within the ns3 simulation environment; it will include both infrastructure components (LTE and Wi-Fi) and terminal-to-terminal protocols. This platform will be used to perform large-scale evaluation of the offloading algorithms in terms of coverage, number of radio nodes and traffic patterns*.

Objective 5 (*To carry out integrated prototyping and trials*).

- *Technical feasibility and user acceptance of the system will be evaluated in the project. Partners' test platforms covering 3G/4G and Wi-Fi infrastructures, complemented with smartphone offloading application modules will be used to implement the key mechanisms of the offloading solution (terminal management, trust maintenance, offloading control and architecture integration).*

Pert diagram