

PhD Application for The PhD Thesis "Decentralized Fog Computing Infrastructure Control"

Ali J. Fahs

Institut de Recherche en Informatique et Systèmes Avancés (IRISA)
MYRIADS Team
Supervised by Professor Guillaume Pierre

Audition, 8th of June, 2017

Outline

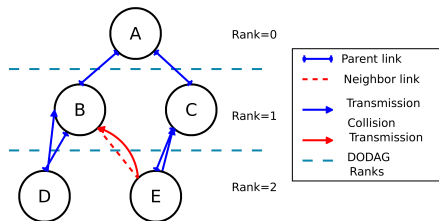
- 1 Personal Presentation
- 2 Master Thesis
- 3 State-of-the-Art for Edge Clouding
- 4 PhD Topic
- 5 Project Perspective

- A double diploma student.
 - Engineering diploma in telecommunication and computer science - Lebanese University, Faculty of engineering (Home University).
 - Master's degree in Informatics Grenoble (MoSIG) Parallel, Distributed Systems Track - Grenoble INP, Ensimag jointly with UGA, IMAG (Host University).
- Research interest: Distributed systems, Networking.
- Master's thesis "Distributed Approach for Cross-Layer Resource Allocation in Wireless Sensor Networks" Jointly between LIG and VERIMAG.

Internship objectives

- Improvement in the distributed 6TiSCH networks

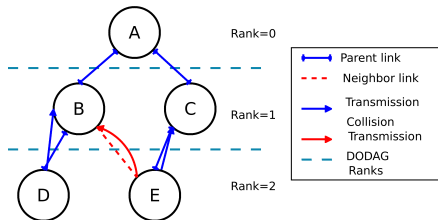
		Time Slot				
		0	1	2	3	4
Channel Offset	0	Shared Slot				B>A
	1		C>A			
	2		B>D		D>B E>C	
	3					



Internship objectives

- Improvement in the distributed 6TiSCH networks
- Reduction of collision in TSCH Dedicated cells.

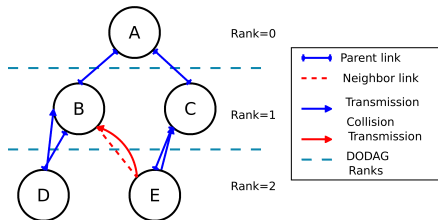
		Time Slot				
		0	1	2	3	4
Channel Offset	0	Shared Slot				B>A
	1		C>A			
	2		B>D		D>B E>C	
	3					



Internship objectives

- Improvement in the distributed 6TiSCH networks
- Reduction of collision in TSCH Dedicated cells.
- The distributed approach causing the problem.

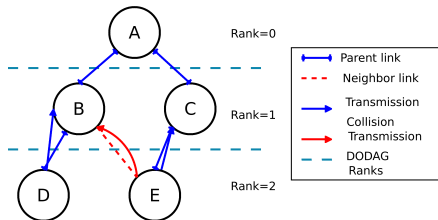
		Time Slot				
		0	1	2	3	4
Channel Offset	0	Shared Slot				B>A
	1		C>A			
	2		B>D		D>B E>C	
	3					



Internship objectives

- Improvement in the distributed 6TiSCH networks
- Reduction of collision in TSCH Dedicated cells.
- The distributed approach causing the problem.
- Lack of central entity.

		Time Slot				
		0	1	2	3	4
Channel Offset	0	Shared Slot				B>A
	1		C>A			
	2		B>D		D>B E>C	
	3					

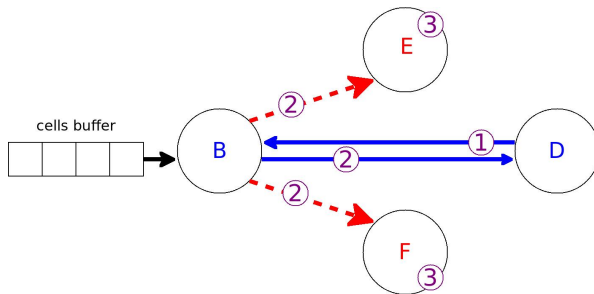


Proposed Mechanism

- Local Mutual exclusion.

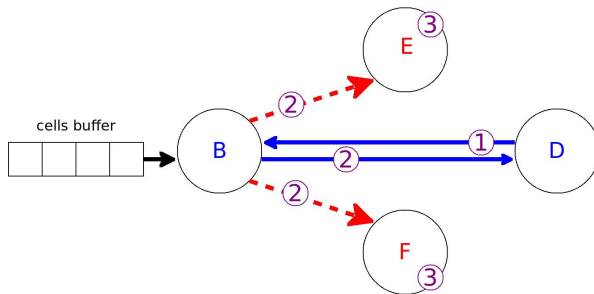
Proposed Mechanism

- Local Mutual exclusion.
- Using already existing transaction.



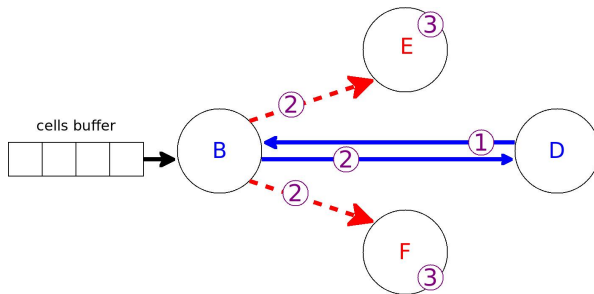
Proposed Mechanism

- Local Mutual exclusion.
- Using already existing transaction.
- No new traffic was induced.

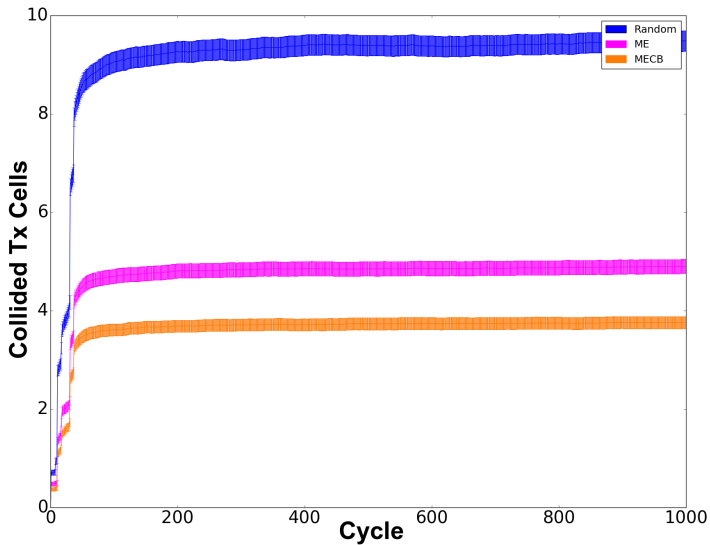


Proposed Mechanism

- Local Mutual exclusion.
- Using already existing transaction.
- No new traffic was induced.
- Achieved 70% reduction in the colliding Tx cells.



Internship Results



State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*

State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*
- Application-Network wall.

State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*
- Application-Network wall.
- Edge Clouding: Deploying Cloudlets in the immediate end user proximity.

State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*
- Application-Network wall.
- Edge Clouding: Deploying Cloudlets in the immediate end user proximity.
- Using single board computers as Cloudlets

State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*
- Application-Network wall.
- Edge Clouding: Deploying Cloudlets in the immediate end user proximity.
- Using single board computers as Cloudlets
- Improvement of end to end latency, and application interactivity.

State-of-the-Art for Edge Clouding

- Clouding disadvantages: latency, mobility, *etc...*
- Application-Network wall.
- Edge Clouding: Deploying Cloudlets in the immediate end user proximity.
- Using single board computers as Cloudlets
- Improvement of end to end latency, and application interactivity.
- Current fog computing platforms remains centralized.

Challenges

- Centralized control over a distributed compute/storage resources.

Challenges

- Centralized control over a distributed compute/storage resources.
- Drawbacks of the centralized: Unnecessary traffic, latency, fragile.

Challenges

- Centralized control over a distributed compute/storage resources.
- Drawbacks of the centralized: Unnecessary traffic, latency, fragile.
- Implementing very large number of potentially unreliable servers.

Challenges

- Centralized control over a distributed compute/storage resources.
- Drawbacks of the centralized: Unnecessary traffic, latency, fragile.
- Implementing very large number of potentially unreliable servers.
- leveraging without handling the complexity of application deployment, fault tolerance, reconfiguration, or elasticity.

Objectives

- Applying a distributed mechanism to manage the resources.

Objectives

- Applying a distributed mechanism to manage the resources.
- Comparing the performance of Distributed mechanisms to centralized ones.

Objectives

- Applying a distributed mechanism to manage the resources.
- Comparing the performance of Distributed mechanisms to centralized ones.
- executing cloud resource scheduling algorithms.

Objectives

- Applying a distributed mechanism to manage the resources.
- Comparing the performance of Distributed mechanisms to centralized ones.
- executing cloud resource scheduling algorithms.
- executing gossip-based algorithms.

Project Perspective

- The importance of the topic.

Project Perspective

- The importance of the topic.
- Solutions using Gossip algorithms.

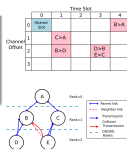
Project Perspective

- The importance of the topic.
- Solutions using Gossip algorithms.
- Advancing state-of-the-art to this hot topic.

Master Thesis

Internship objectives

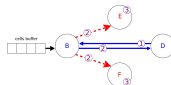
- Improvement in the distributed 6TSCN networks
- Reduction of collision in TSCN Dedicated cells.
- The distributed approach causing the problem.
- Lack of central entity.



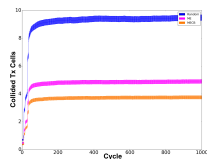
Master Thesis

Proposed Mechanism

- Local Mutual exclusion.
- Using already existing transaction.
- No new traffic was induced.
- Achieved 70% reduction in the colliding Tx cells.



Internship Results



State of Art for Edge Clouding

- Clouding disadvantages: latency, mobility, etc...
- Application-Network wall.
- Edge Clouding: Deploying Cloudlets in the immediate end user proximity.
- Using single board computers as Cloudlets
- Improvement of end to end latency, and application interactivity.
- Current fog computing platforms remains centralized.

PhD Topic

Objectives

- Applying a distributed mechanism to manage the resources.
- Comparing the performance of Distributed mechanisms to centralized ones.
- executing cloud resource scheduling algorithms.
- executing gossip-based algorithms.

Project Perspective

- The importance of the topic.
- Solutions using Gossip algorithms.
- Advancing state-of-the-art to this hot topic.

Thanks for your attention!
Questions?