

## COMUNICAÇÃO TÉCNICA

Nº 177635

**Apoyo de los ITS al Comité de Crisis frente al Covid 19 em São Paulo**

**Alessandro Santiago dos Santos**

*Palestra on-line apresentada no evento In: CONGRESO  
IBEROAMERICANO SISTEMAS INTELIGENTES DE TRANSPORTE, 4., 4  
de nov., 2021, São Paulo 14 slides*

A série “Comunicação Técnica” comprehende trabalhos elaborados por técnicos do IPT, apresentados em eventos, publicados em revistas especializadas ou quando seu conteúdo apresentar relevância pública.

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# IV Congreso Iberoamericano

## SISTEMAS INTELIGENTES DE TRANSPORTE



Apoyo de los ITS al Comité de Crisis  
frente al Covid 19 en São Paulo

Alessandro Santiago dos Santos

Institute for technological Research - IPT

# Contents



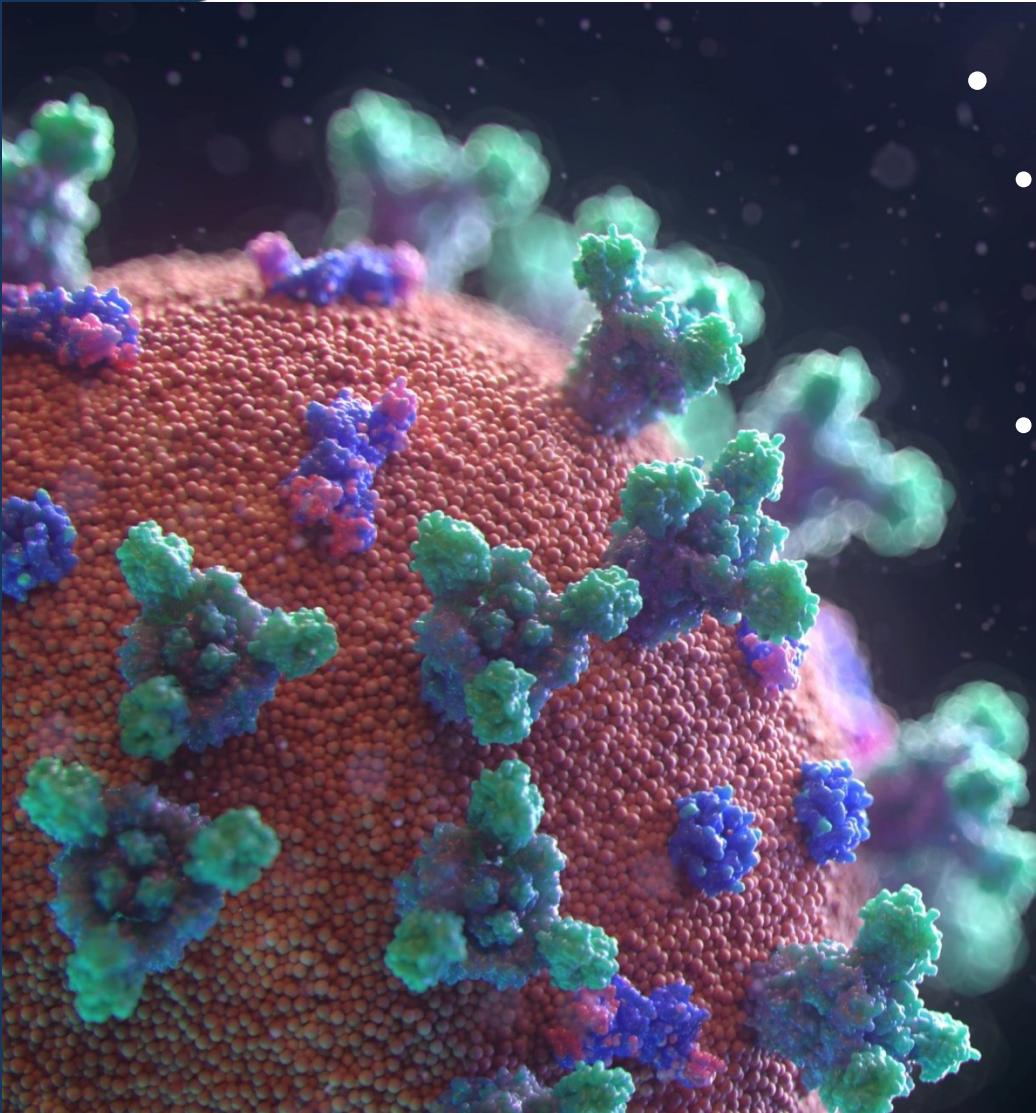
- 1. Introduction and Crisis committee for Covid**
- 2. Mobily monitoring and ITS support**
- 3. Analysis and results**

# 1

# Introduction



- COVID-19 in São Paulo
  - High impacts in Economy, HealthCare and humanitarian aspects
  - Actions
    - Establish public policies for rapid response
    - Create crisis committees
    - Monitor the dissemination and impacts



# Brazil - São Paulo Case



Crisis room for Covid in São Paulo

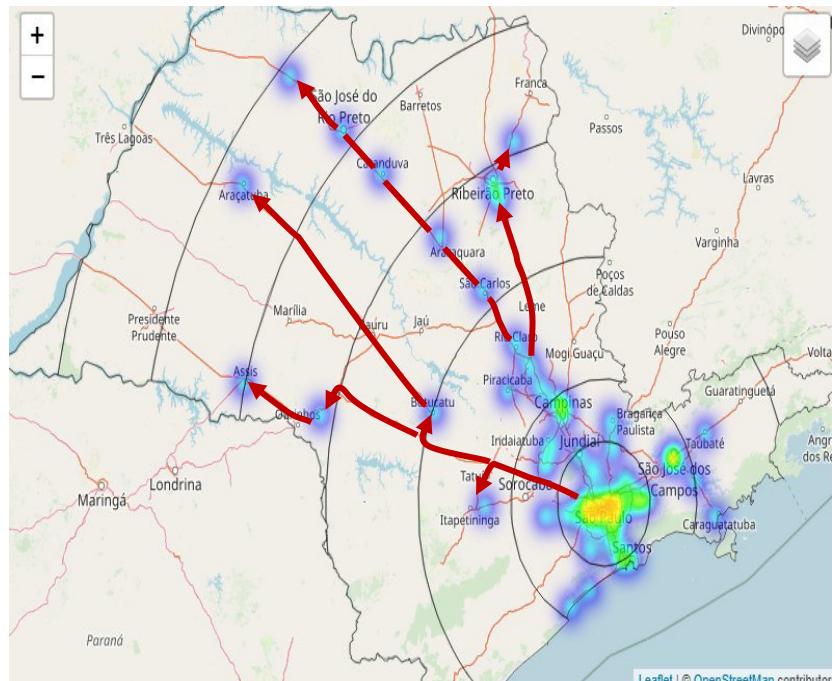
- 1. Biggest state and start point in Brazil**
- 2. Information Systems and Intelligent Monitoring**
- 3. Using agile methods for fast deployment in 3 perspectives**
  - Mobility (isolation and traffic flows)
  - Economy
  - Healthcare

# Motivations



*The dissemination was using the highways*

In 10th week, the dissemination “run” in Highways to the country state



Highway: Rod. Castelo Branco e Raposo Tavares

Highway: Rod. Marechal Rondon

Highway: Rod. Washington Luiz

Highway: Anhanguera



- Questions

- How was the virus spreading from capital (epicenter) to country?
- Is it possible to analyze the economic impacts based on mobility patterns?

- Strategies

- Integration by ITS stakeholders
- Use ITS infrastructure to supply information



# Architecture

- Integrate ITS equipment and systems inside COVID-19 crisis room
  - Vehicle counters (volume)
  - Toll collection payments
  - AVI tags and Speed cameras (Origin-Destination mapping)



# 3

# Traffic flow analysis



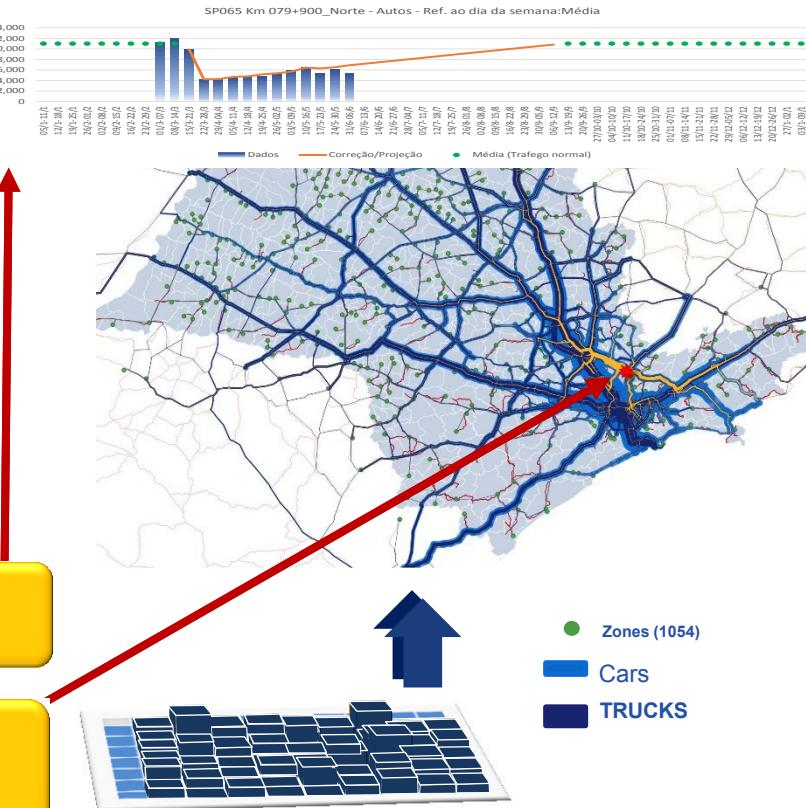
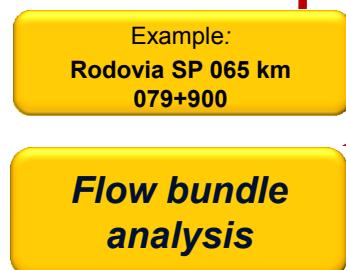
## Activities:

### Origin-Destination pattern

Routes based in data from Speed cameras and tags

### Flow Bundles using data flow from ITS stakeholders

**451** checking points  
(toll plazas and, speed  
câmeras)



# Decision-making

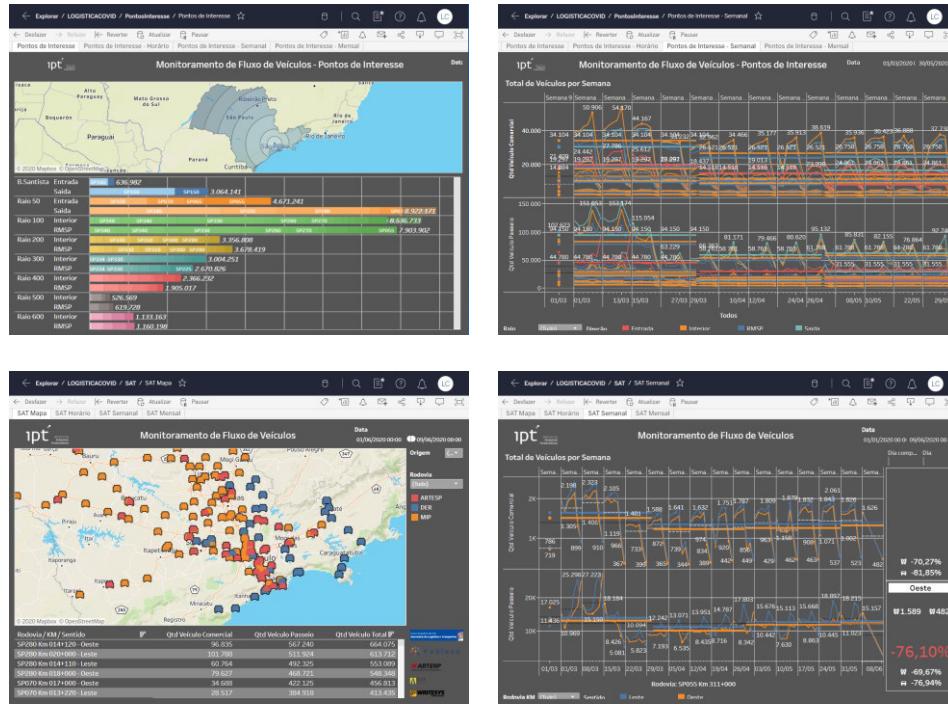


## Activities

Create a DATA LAKE  
with Traffic flow to  
decission-making  
process



AGÊNCIA DE TRANSPORTE DO ESTADO DE SÃO PAULO



On-line Dashboards using  
Business Intelligence  
strategies.

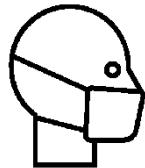


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PESQUISAS  
TECNOLÓGICAS



# 4

# Results and analysis:



**Dissemination risk for regions**



**Economic impacts**

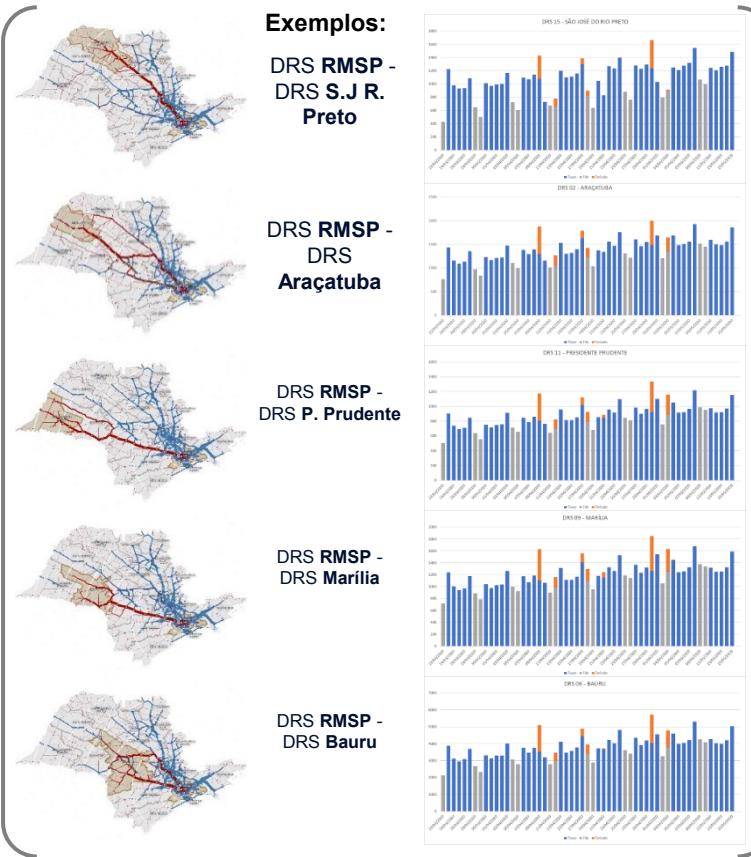
# Risk Mapping for dissemination



Axes  
Semana 14  
29/04/4

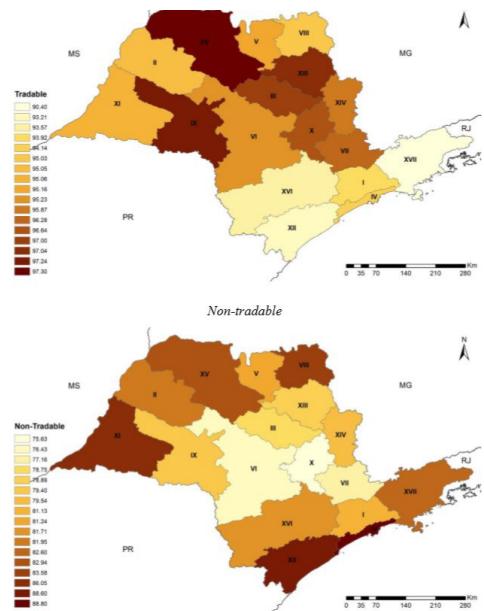
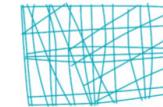
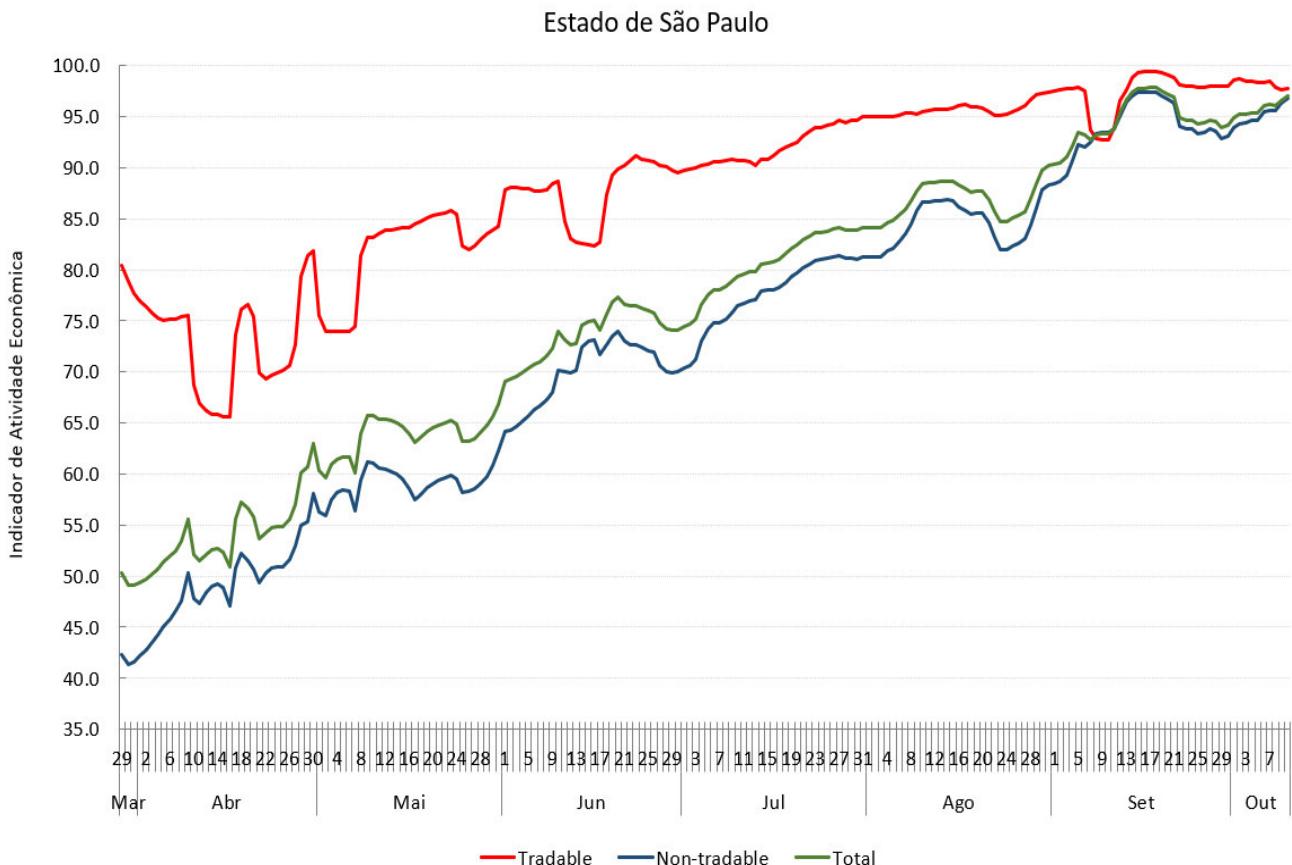
Tipo de vehículo Automóvel 46,15%

Origen	Destino																	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
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Araçatuba	2 42% 31%	34% 35%	35% 32%	32% 33%	32% 31%	31% 32%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%	31% 31%
Arenópolis	3 41% 33%	32% 32%	30% 31%	31% 32%	31% 33%	44% 42%	42% 49%	49% 47%	47% 53%	45% 49%	46% 42%	47% 47%	47% 47%	44% 44%	44% 44%	44% 44%	44% 44%	44% 44%
Bauru_Santista	4 44% 43%	41% 41%	30% 31%	31% 32%	44% 44%	43% 43%	43% 46%	46% 42%	42% 47%	33% 45%	45% 45%	46% 46%	44% 44%	44% 44%	44% 44%	44% 44%	44% 44%	44% 44%
Barretos	5 41% 33%	33% 33%	44% 40%	40% 32%	46% 46%	47% 46%	46% 53%	53% 42%	56% 44%	50% 50%	44% 44%	51% 43%	43% 42%	42% 42%	42% 42%	42% 42%	42% 42%	42% 42%
Bragança	6 41% 33%	33% 33%	44% 43%	43% 42%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%
Campinas	7 45% 47%	43% 42%	42% 42%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%
Francia	8 43% 35%	35% 46%	46% 43%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%
Marília	9 47% 33%	47% 46%	46% 51%	48% 45%	45% 48%	48% 48%	48% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%
Piracicaba	10 43% 39%	39% 44%	44% 43%	42% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%
Presidente Prudente	11 23% 27%	27% 29%	29% 27%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%	27% 31%
Regispolis	12 45% 48%	48% 53%	53% 44%	44% 47%	47% 45%	45% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%
Ribeirão_Preto	13 43% 33%	48% 42%	50% 46%	46% 46%	43% 46%	46% 46%	50% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%	46% 46%
SJ_Belo_Vista	14 43% 45%	46% 42%	42% 46%	46% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%	45% 45%
Sorocaba	15 23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%	23% 23%
Taubaté	16 22% 29%	29% 42%	42% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%	47% 47%
Saína_Dutra_RJ_ES	17 40% 43%	39% 43%	43% 40%	40% 43%	43% 36%	40% 40%	44% 37%	37% 40%	40% 44%	39% 39%	38% 38%	40% 40%	40% 45%	45% 35%	35% 35%	35% 35%	35% 35%	35% 35%



# Economic impacts using mobility pattern

“COVID-19 Crisis Monitor: Assessing the Effectiveness of Exit Strategies  
in the State of São Paulo, Brazil”  
(Eduardo A. Haddad et all, 2020)





# Dashboard Demonstration



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MUCHAS GRACIAS

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