Transport System Governance

Scenarios for shaping the transition of a key European industry

Ruggero Schleicher-Tappeser

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www.sustainablestrategies.eu

Key transformation path:
conventional private car → advanced shared mobility services

		COMFORT	ENVIRONMENT	COSTS	SOCIAL
0	**Conventional private car**				
1	**Electric vehicle**		Drastic reduction of emissions		Better health Fewer jobs
2	**Autonomous electric vehicle**		Optimised driving		Less accidents Less jobs in operation
3	**Public mobility service with AEV**		Less vehicles, less parking space	Drastic capital cost reduction → widespread adoption	No need for own car, better accessibility Fewer jobs
4	**Shared ride driverless mobility service**	Slightly longer trips	Less vehicles circulating, less infrastructure needed	Less operational costs, less infrastructure	Affordable transport for all challenge: urban/ rural, modal split
5	**Integrated flexible inter-modal mobility service**	Seamless comfort		Optimised tariffs across system	

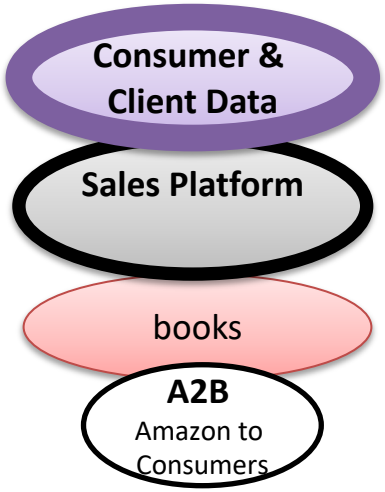
worse → better

Digitalisation:
The winner takes all

- Digitalisation means easily scalable structures
  - Digital representation drastically facilitates the management of physical structures and real assets
  - Digital processing and management systems are extremely scalable
  - Client access has been dramatically facilitated by the internet and digital representation and is extremely scalable
  - Cloud computing, hardware and software development continue to accelerate this process
- Large data collections can constitute monopolies
  - Large data collections can dramatically improve provided services
  - Rapid data scaling can build large data collections and unbeatable services
- Platform effects can constitute monopolies
  - For platform services a higher number of customers increases the attractiveness
  - Rapid customer scaling is essential for platforms
- The need for rapid scaling disrupts traditional markets

Data-driven cross-sector & vertical expansion: the case of **AMAZON**

data
systems
SW Technologies
HW technologies
products



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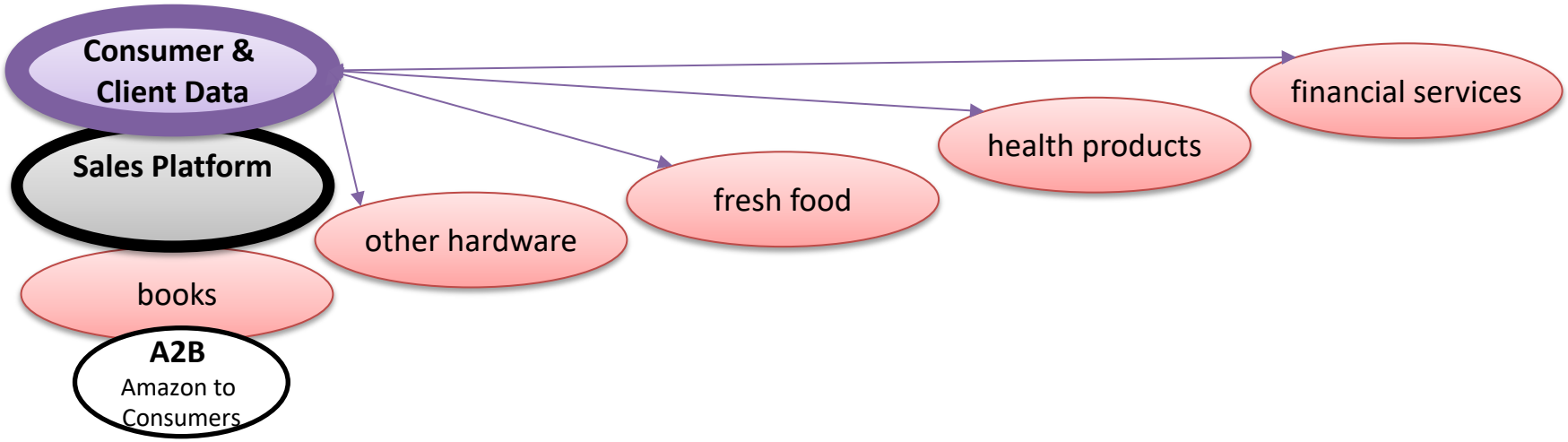

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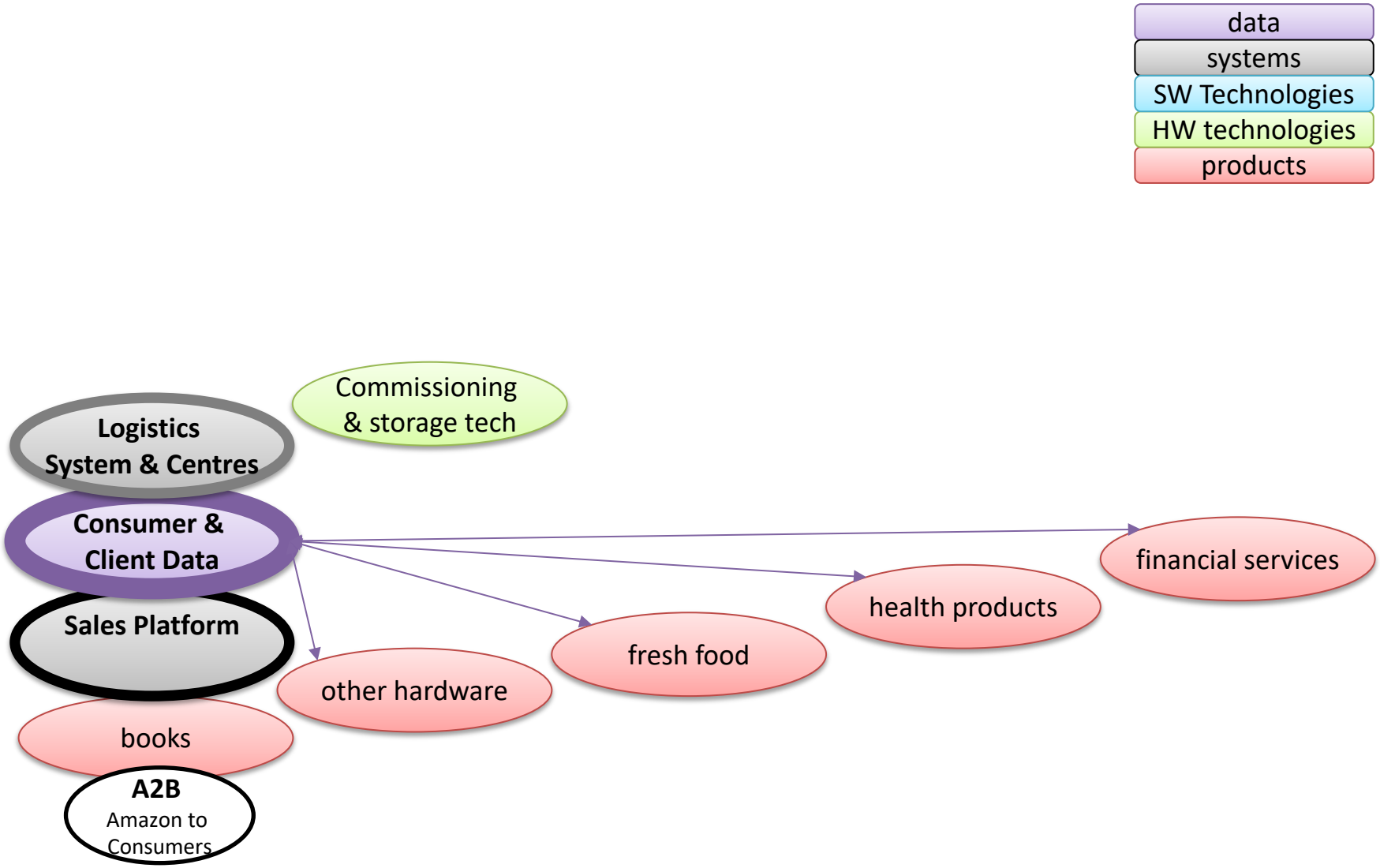

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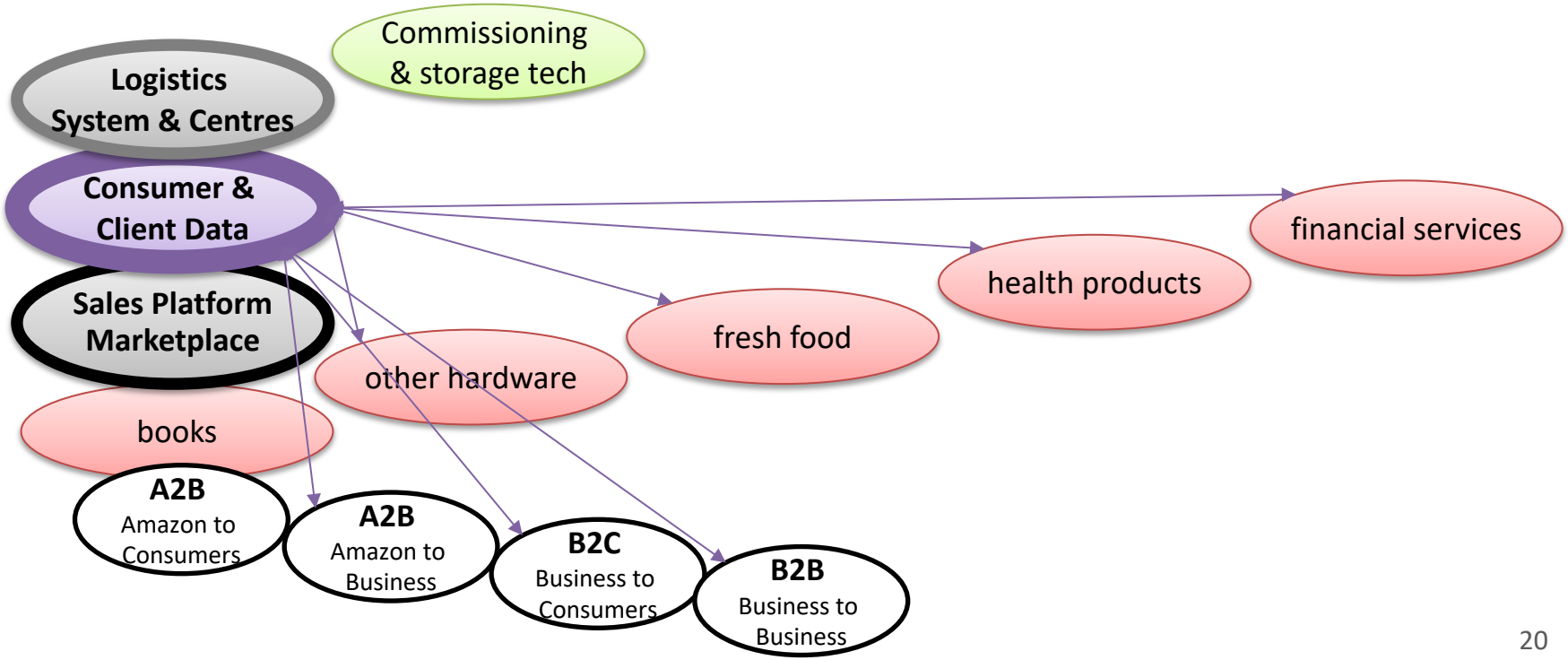

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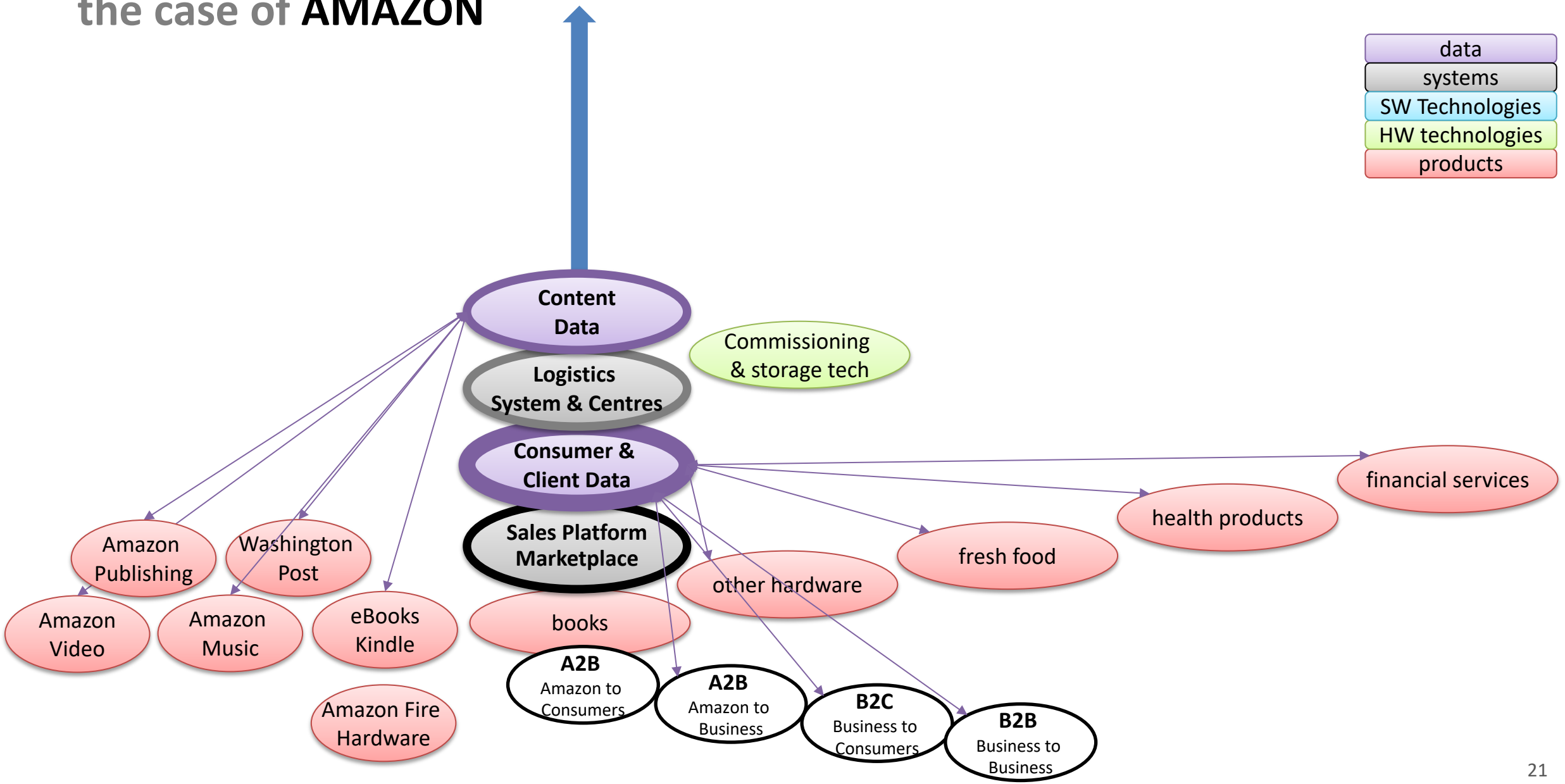

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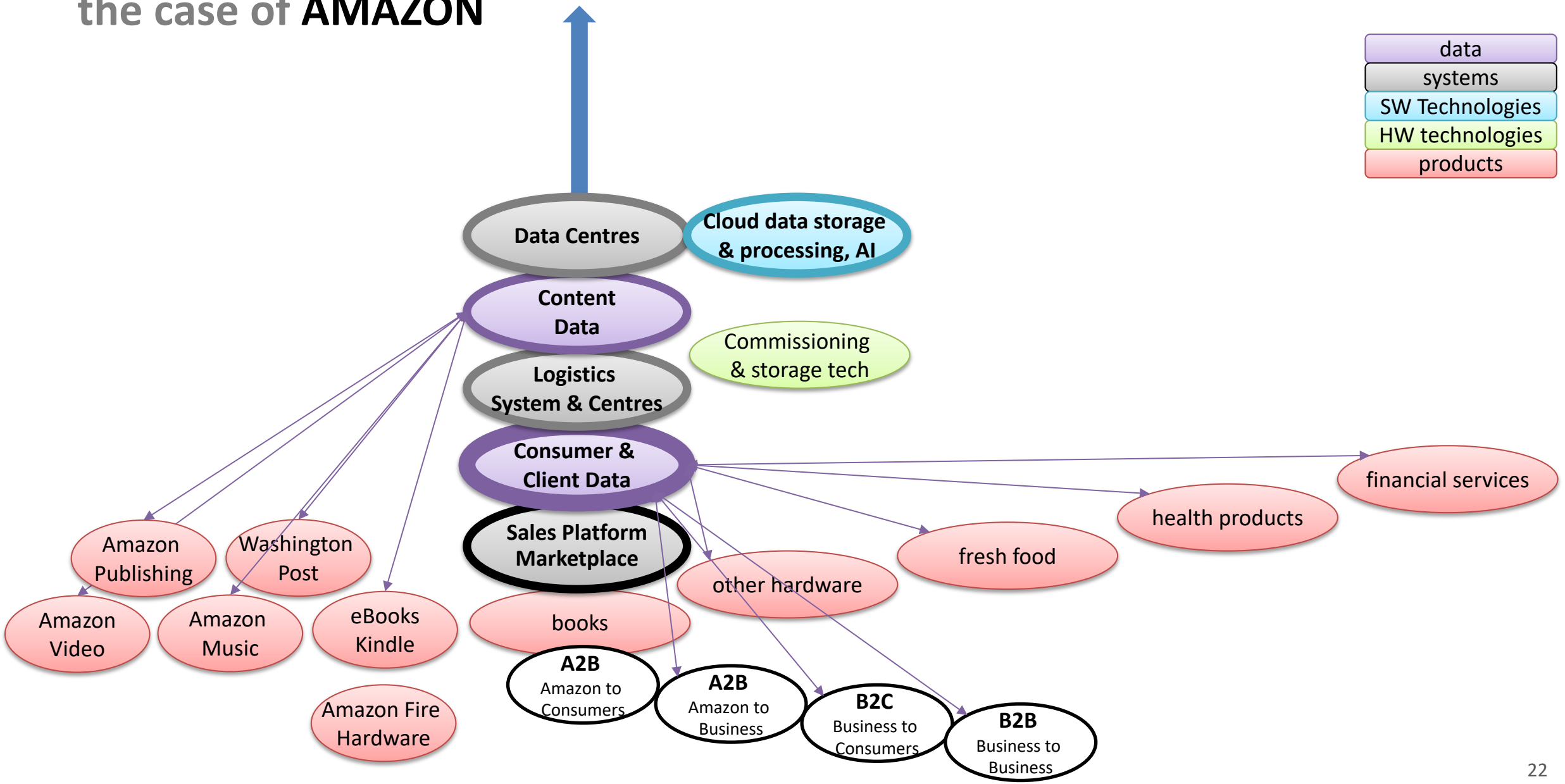

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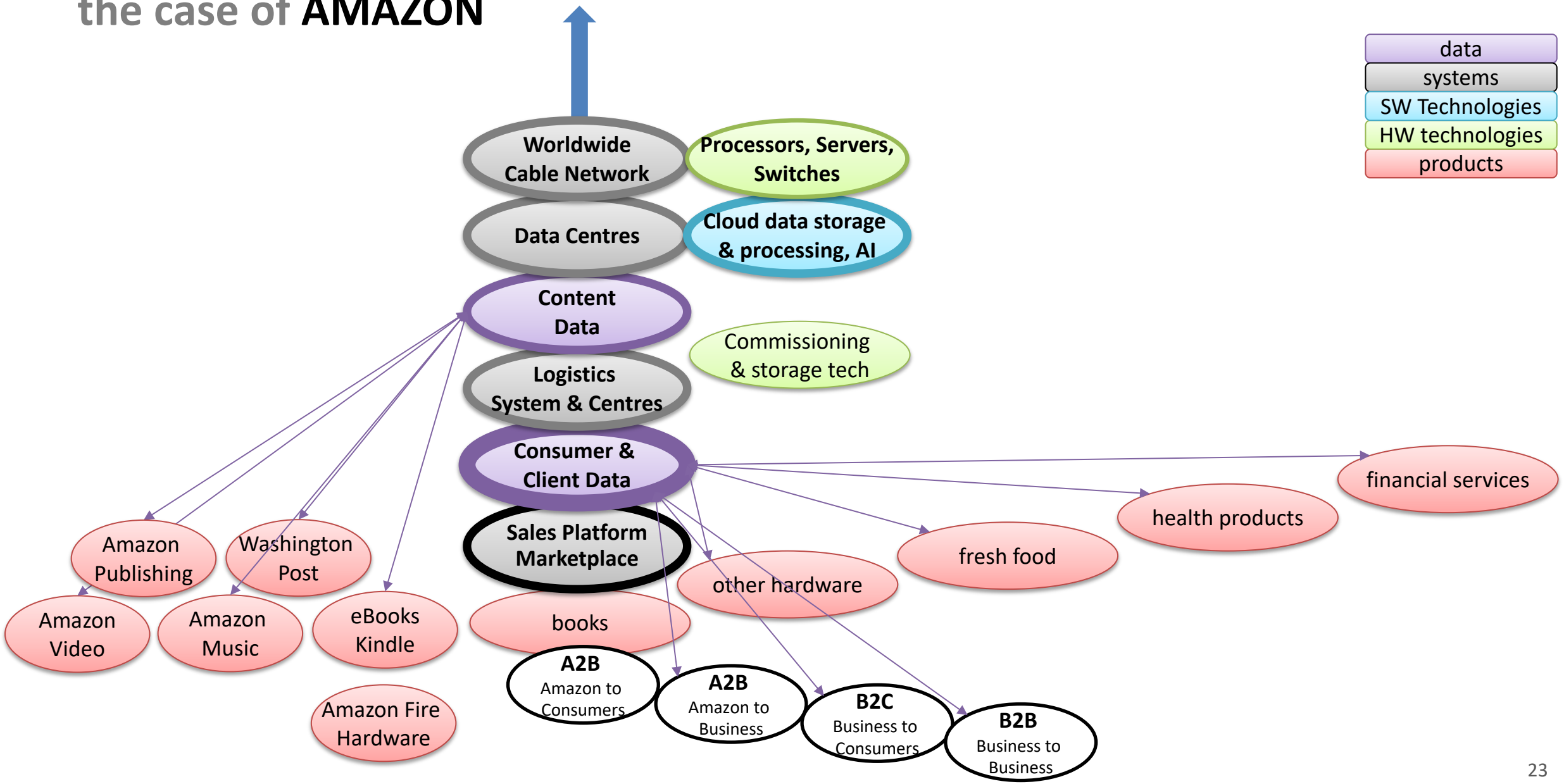

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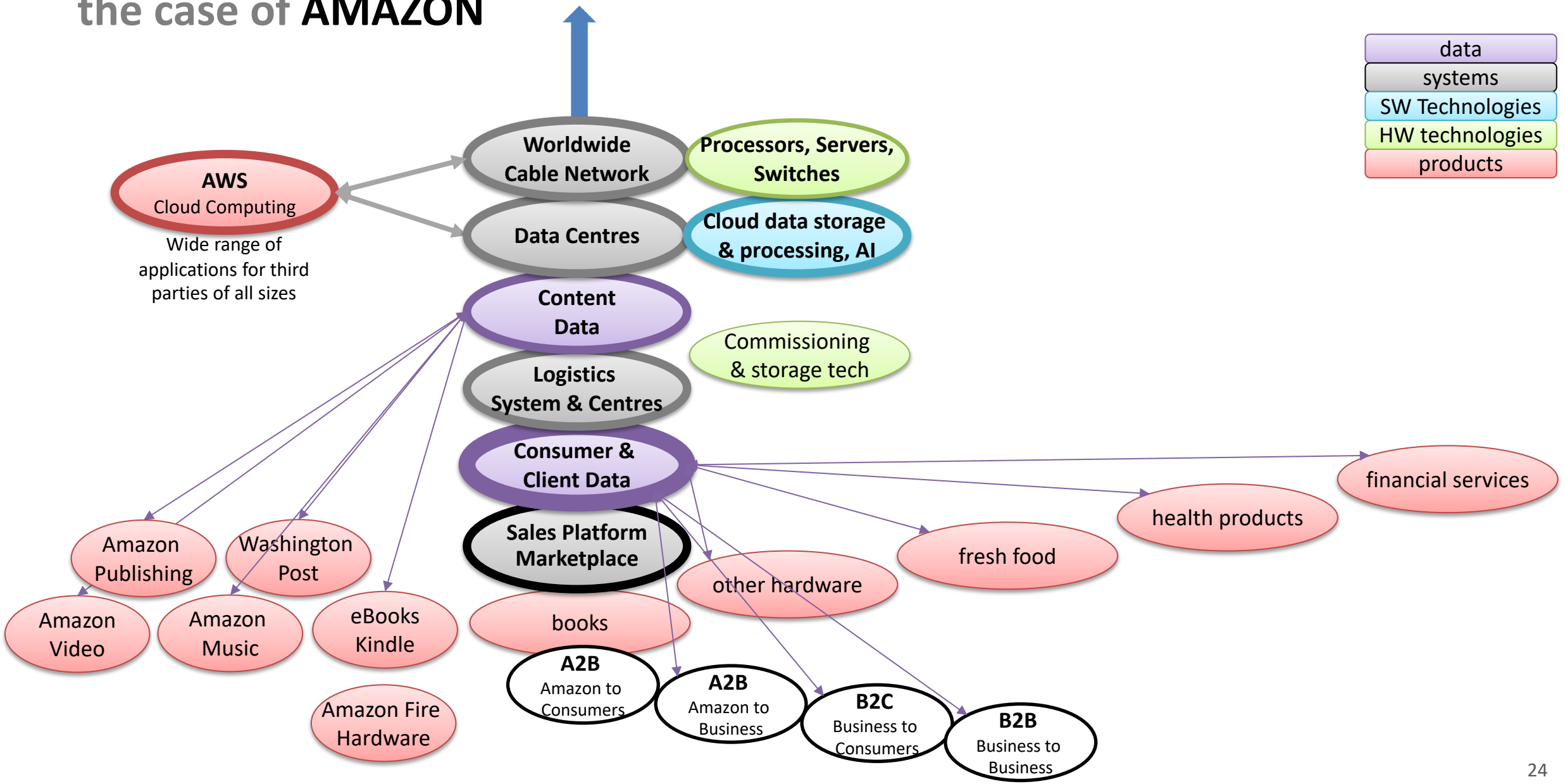

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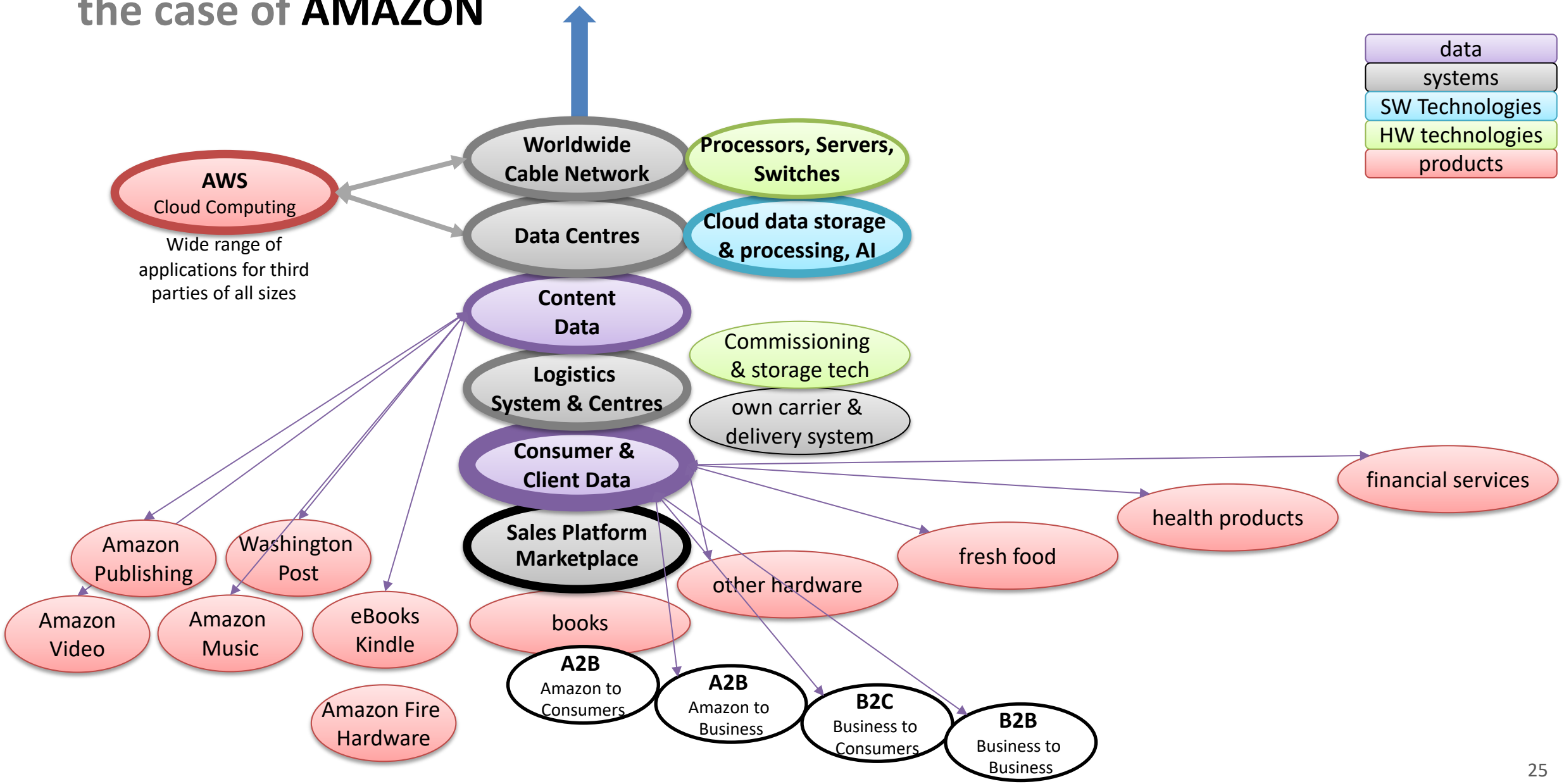

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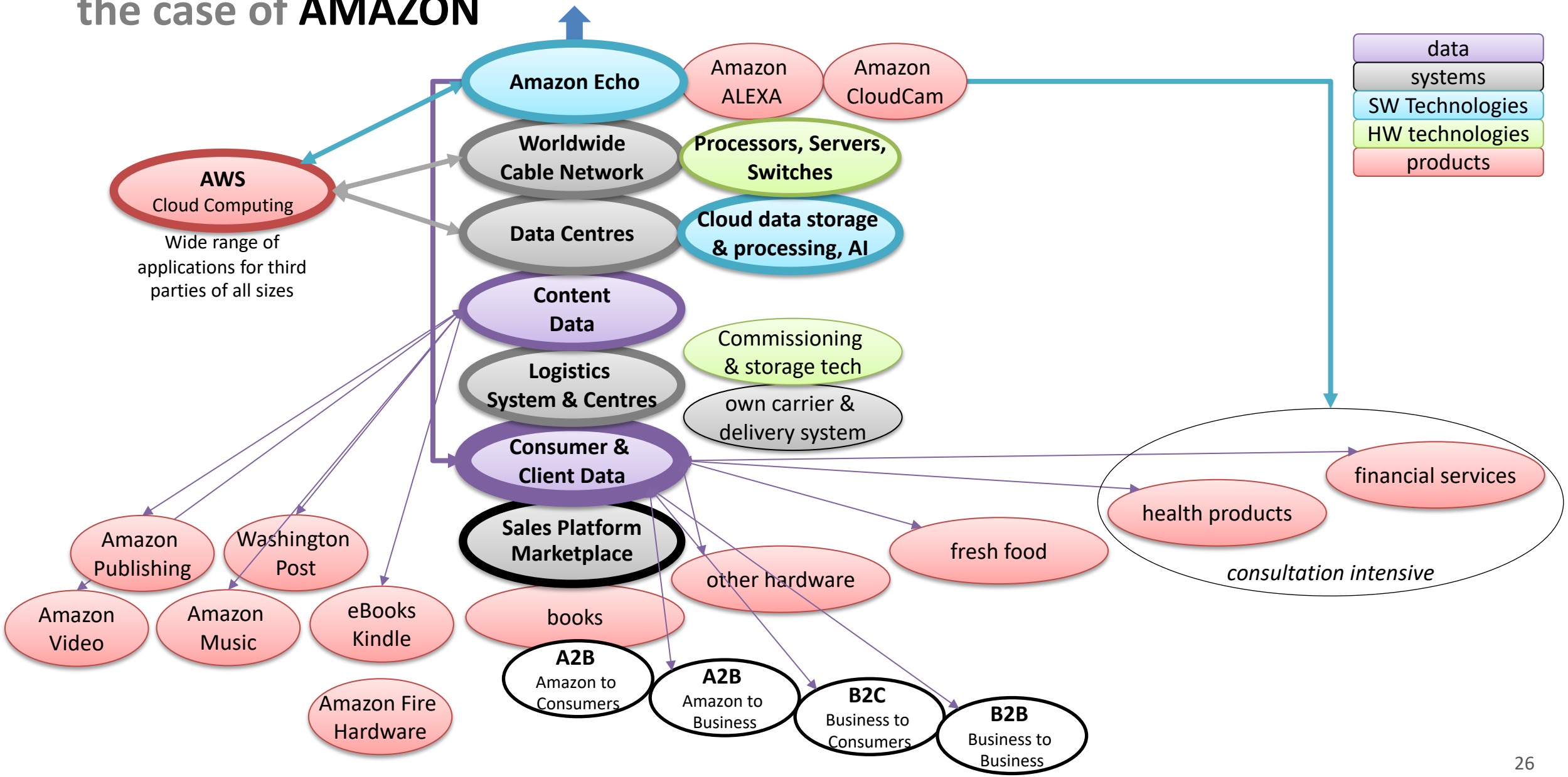

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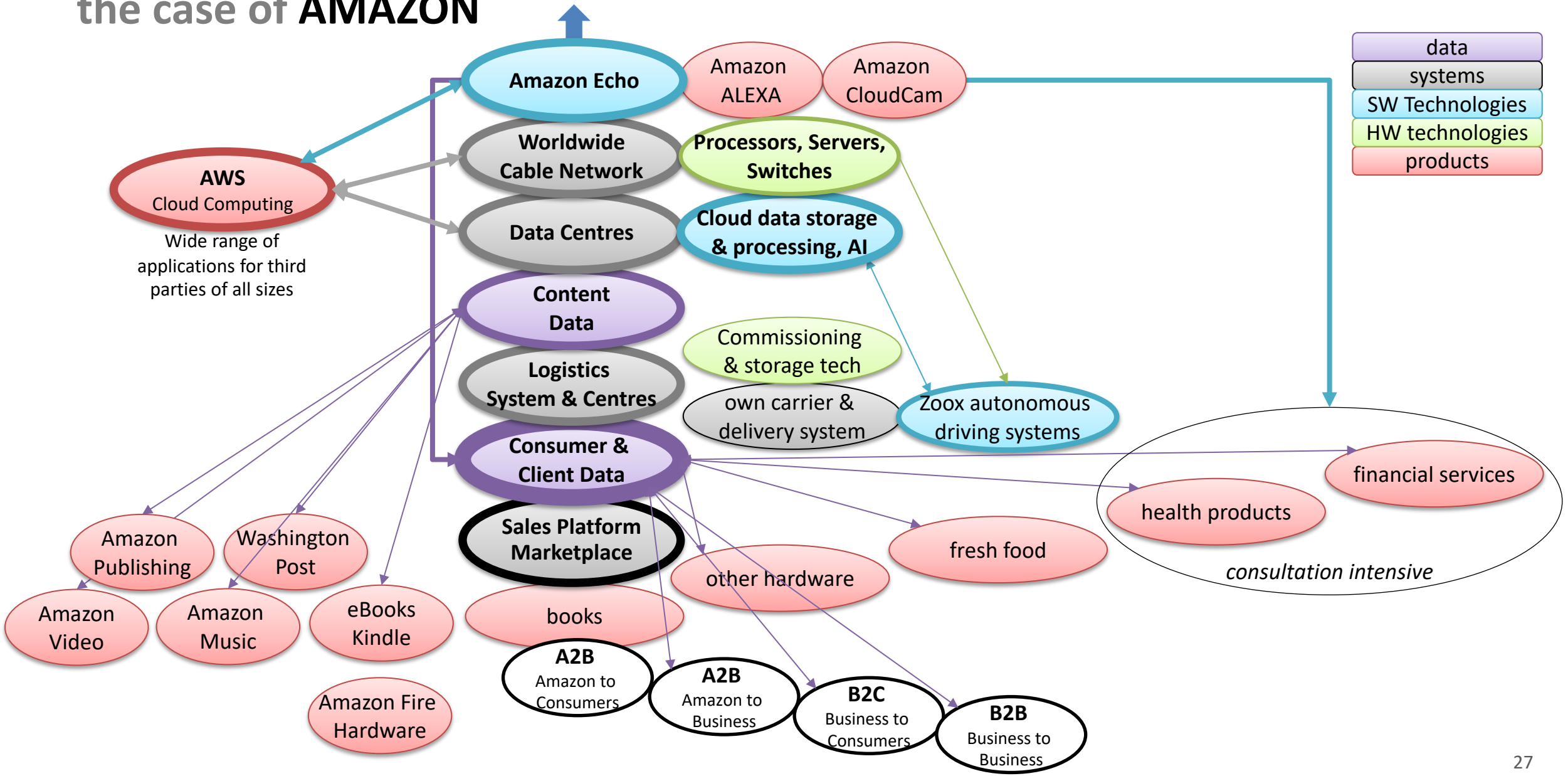

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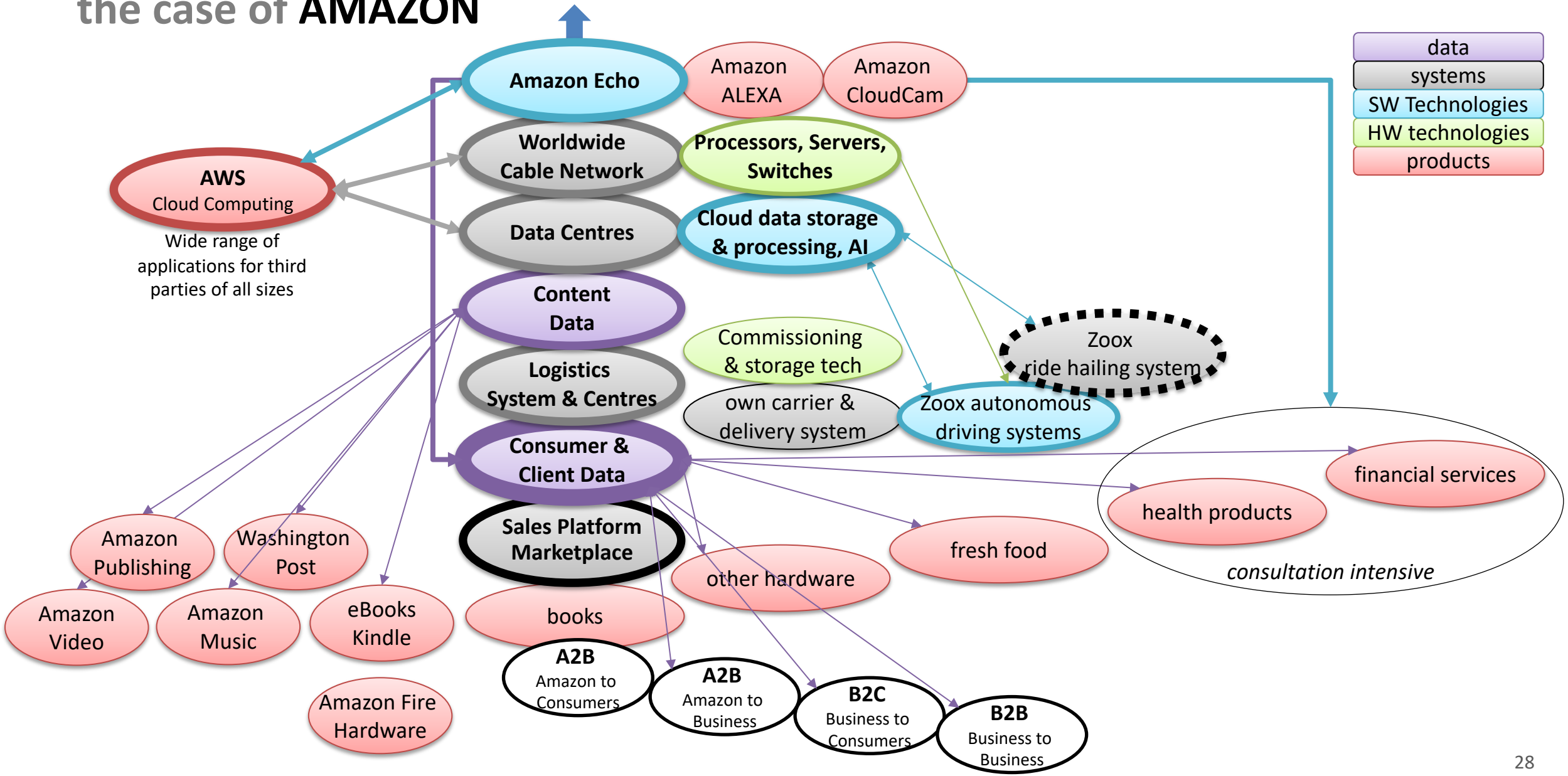

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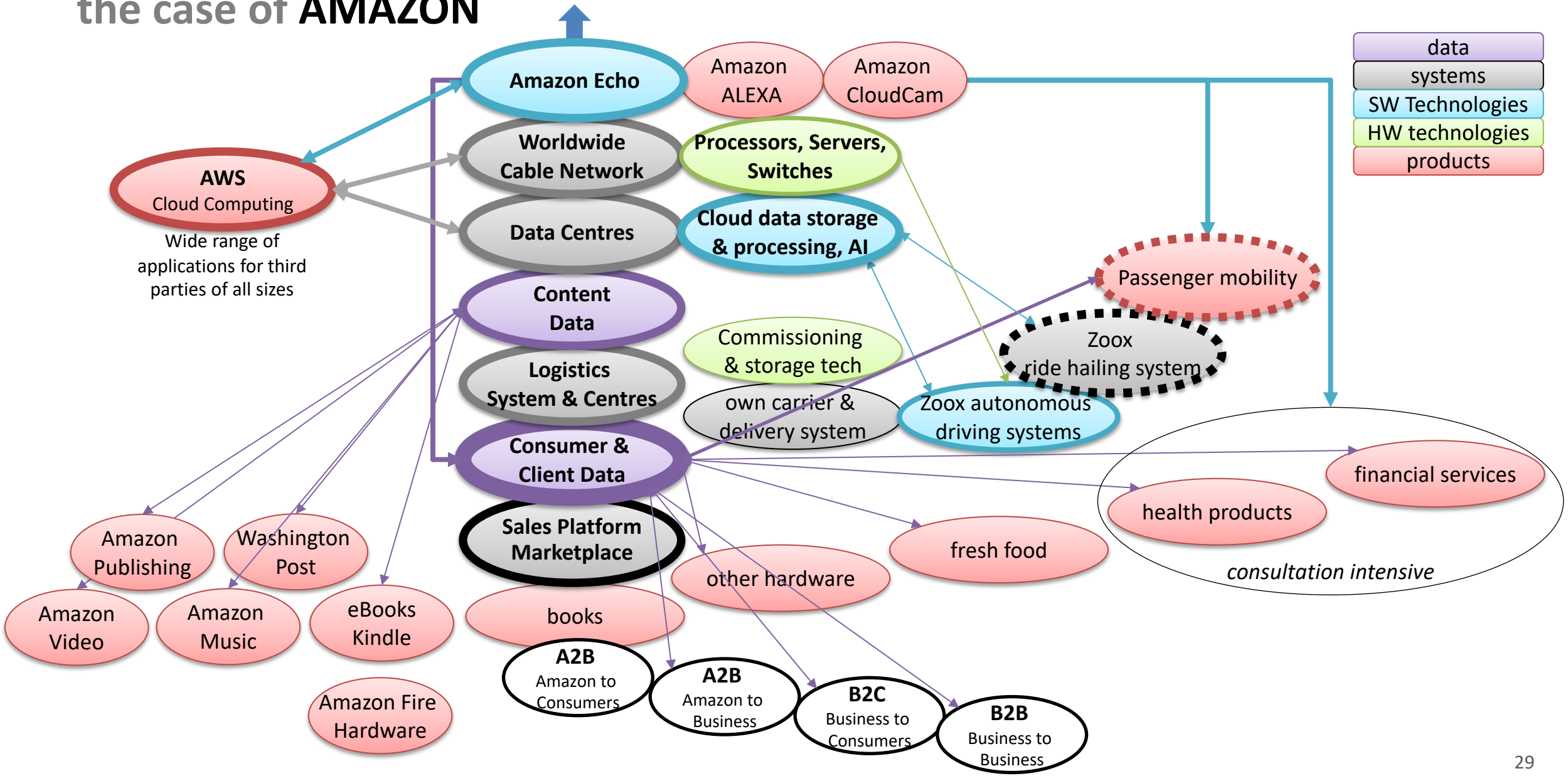

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products

Car OS
Operating System

Electric vehicle technologies

Data-driven cross-sector & vertical expansion: the case of **TESLA**

data
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SW Technologies
HW technologies
products

Customer data

Car OS
Operating System

Electric vehicle technologies

E-vehicle production

Cars

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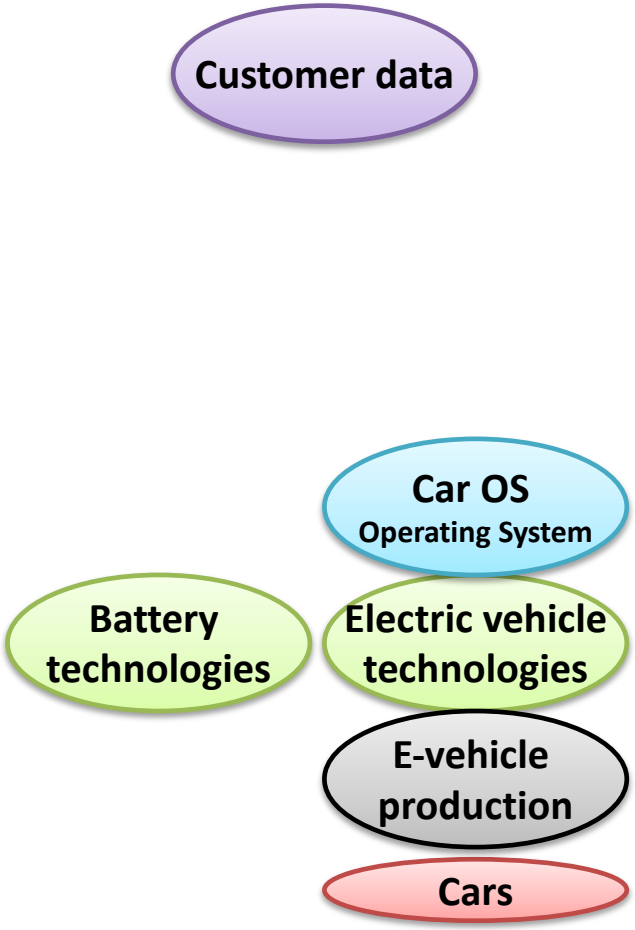

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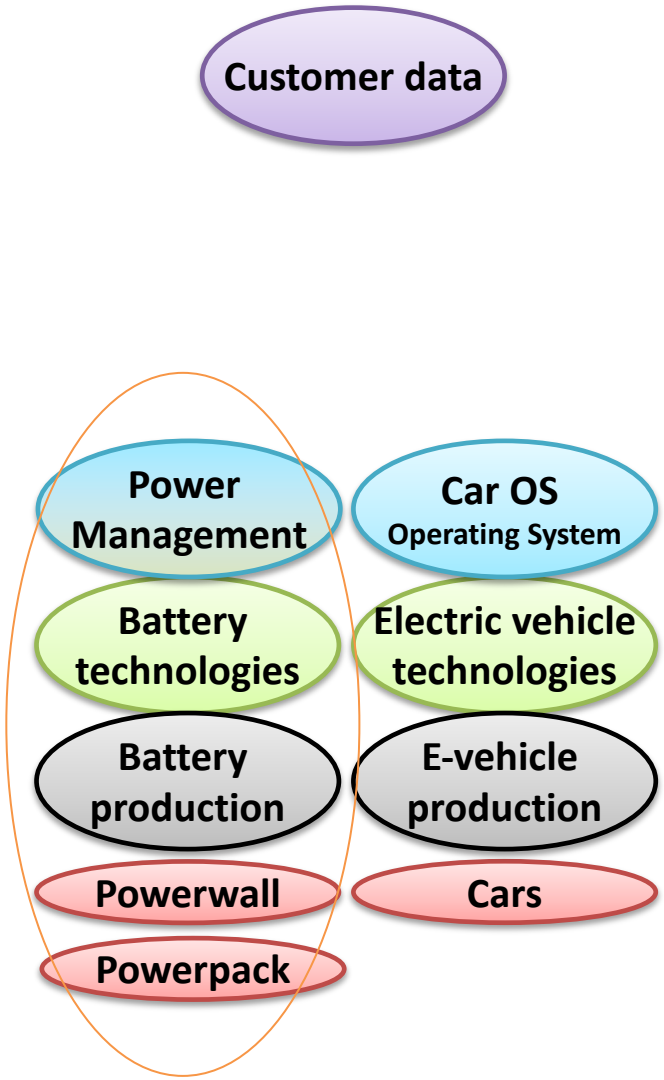

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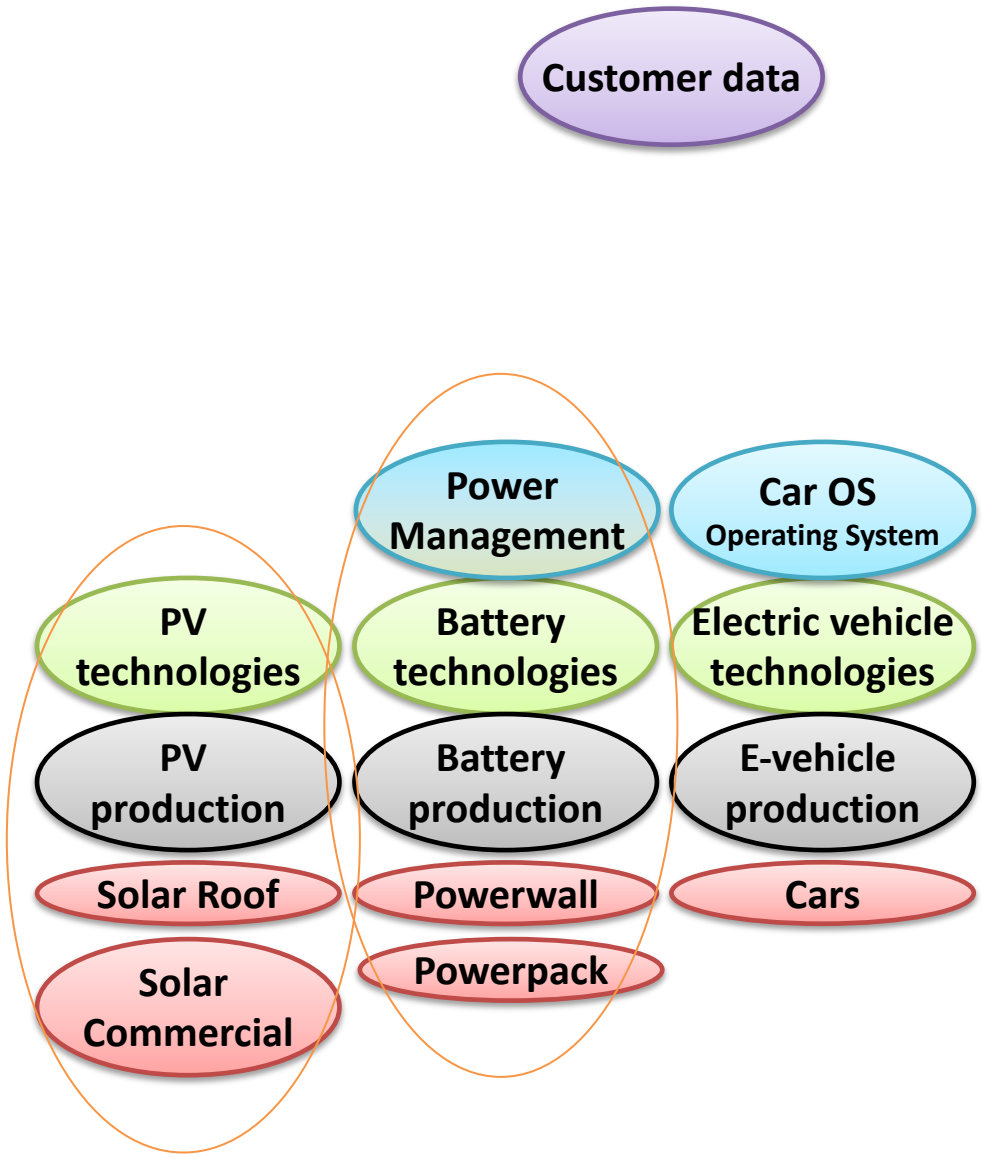

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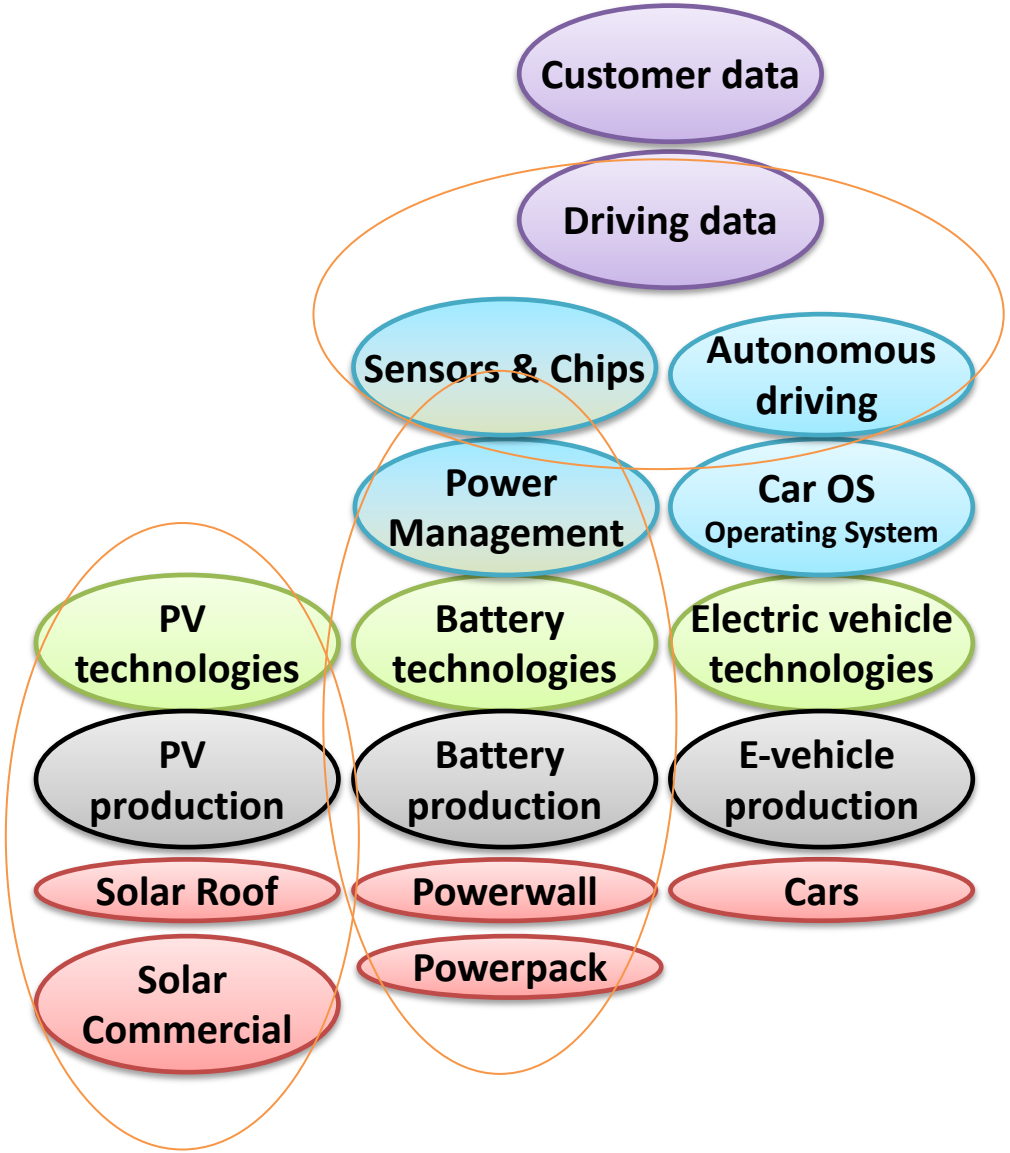

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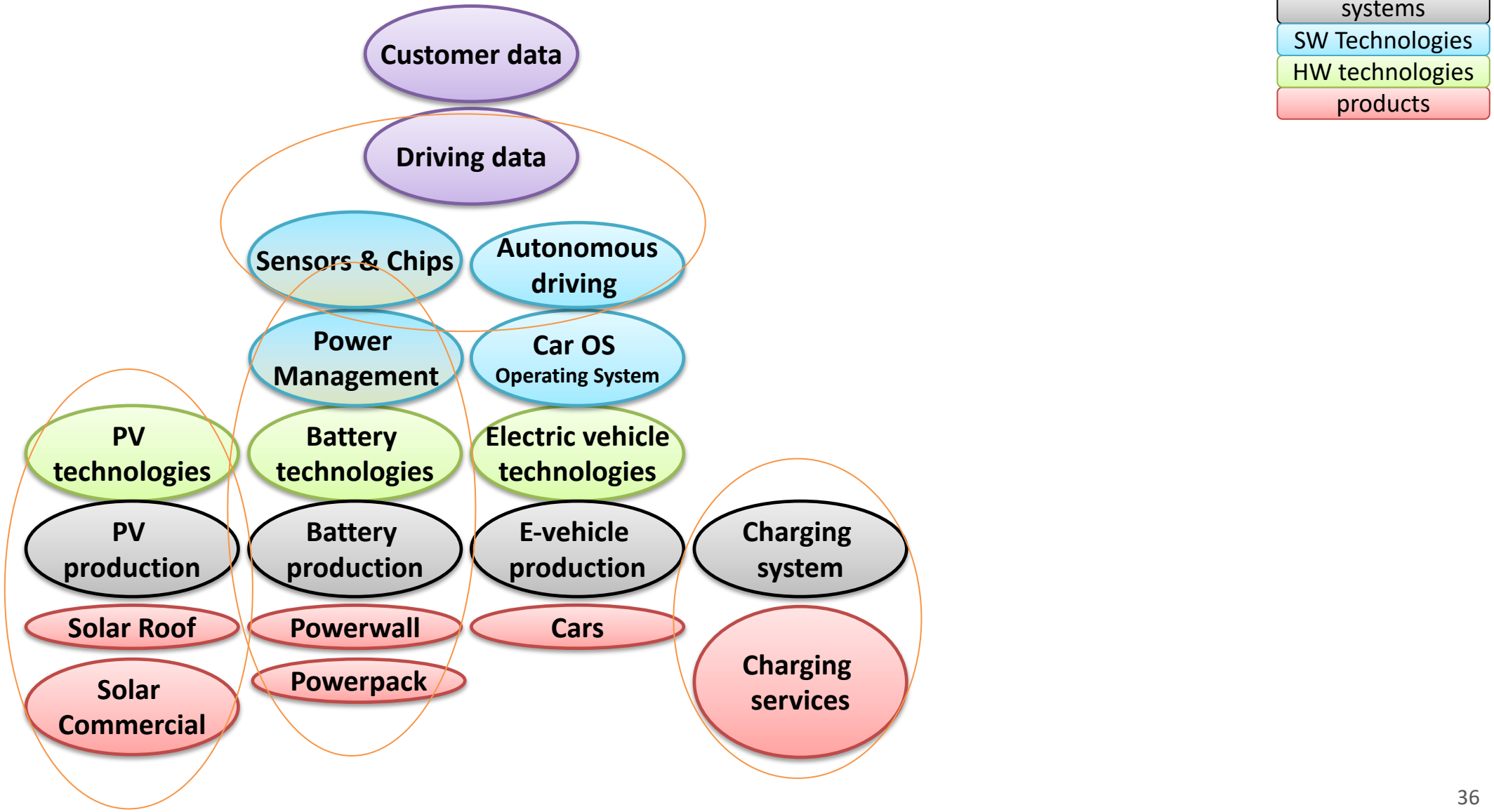

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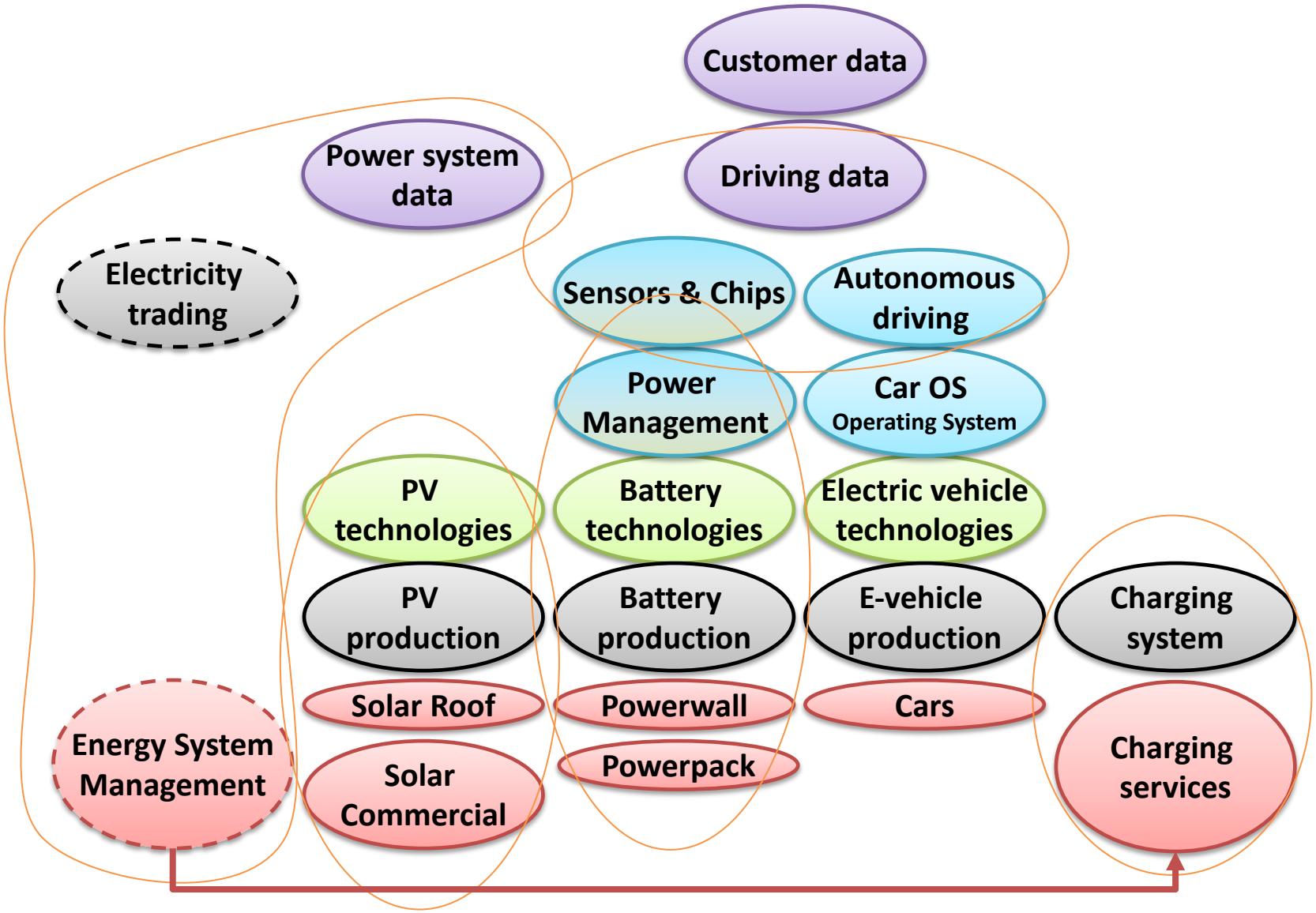

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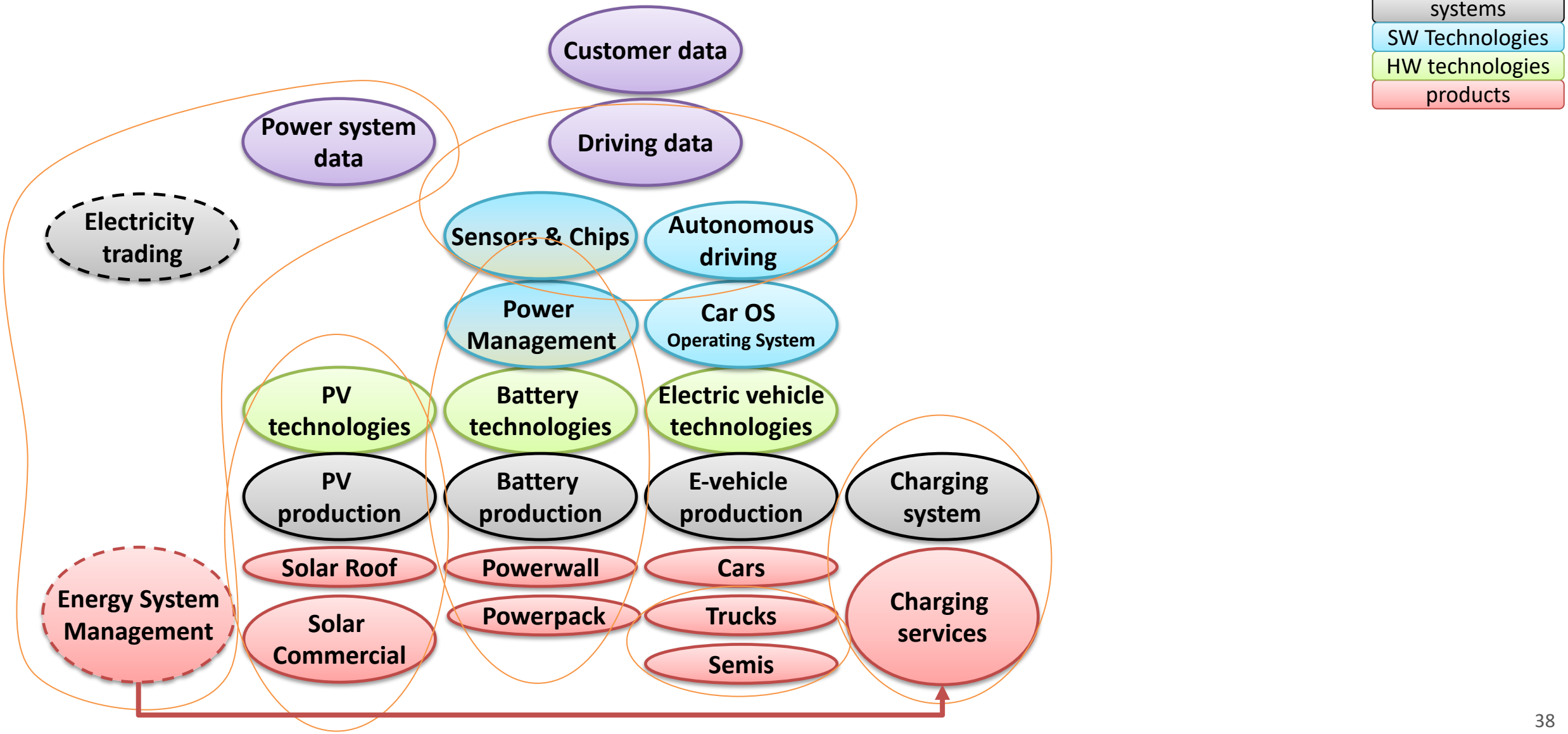

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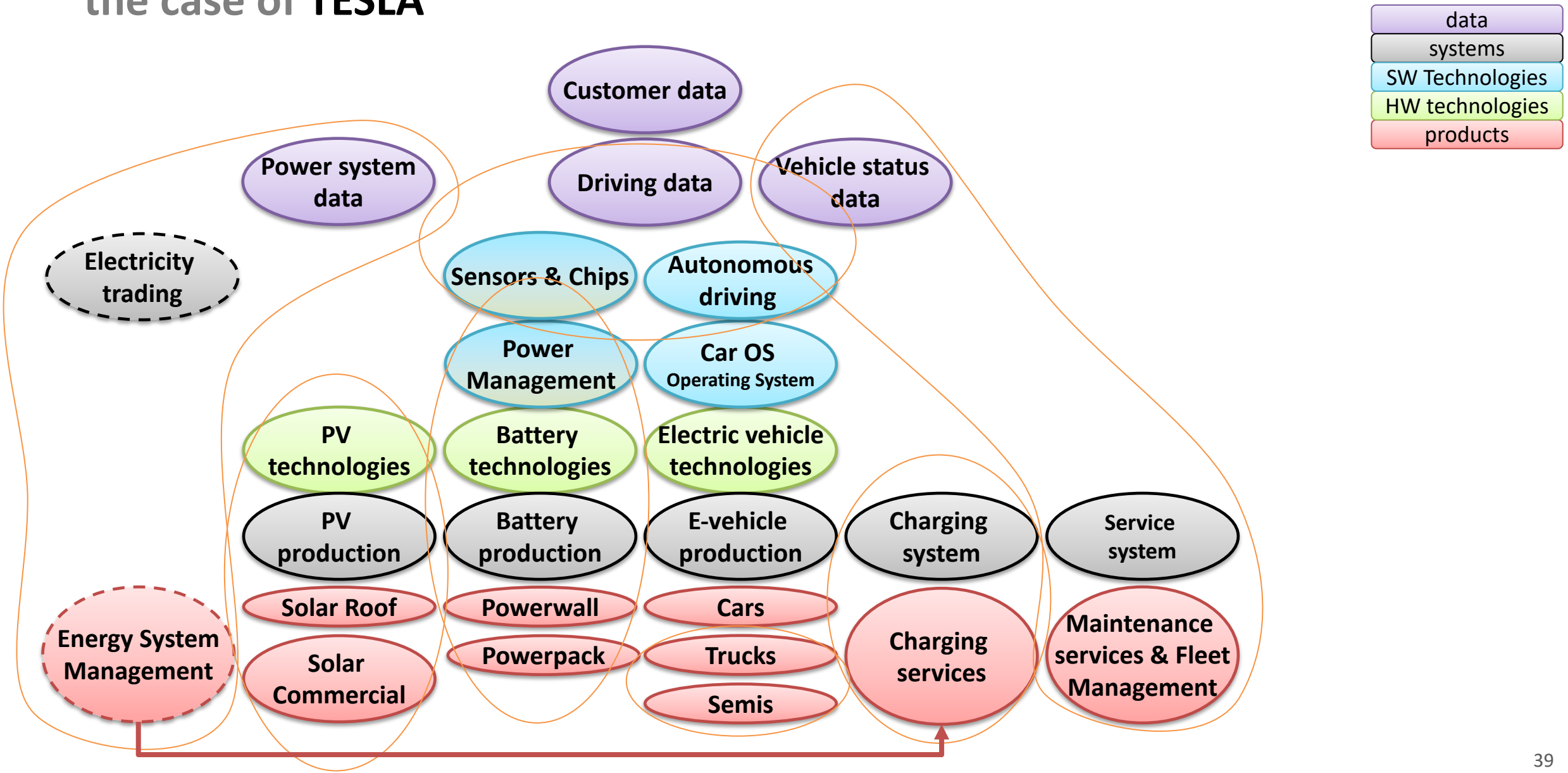

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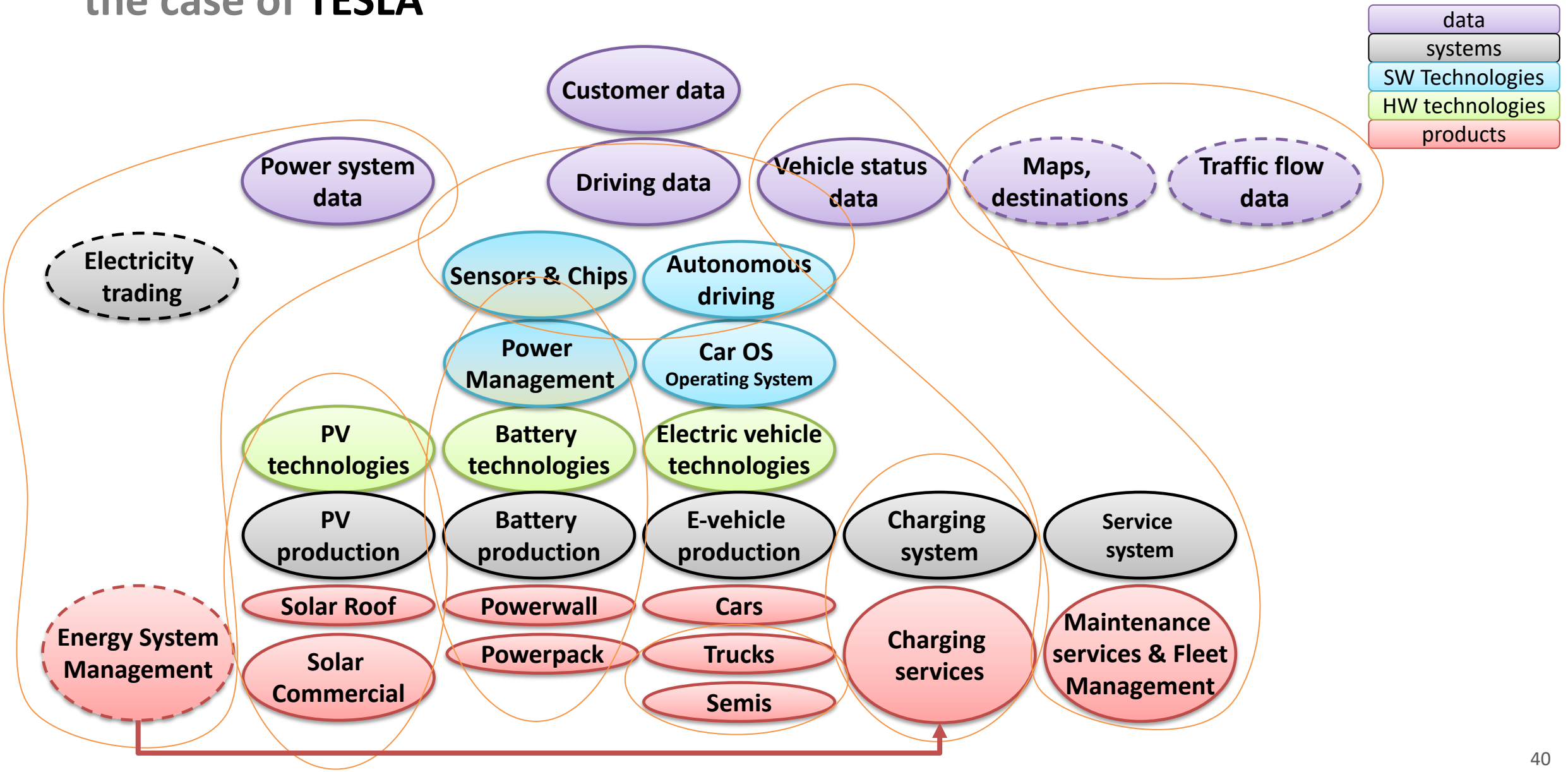

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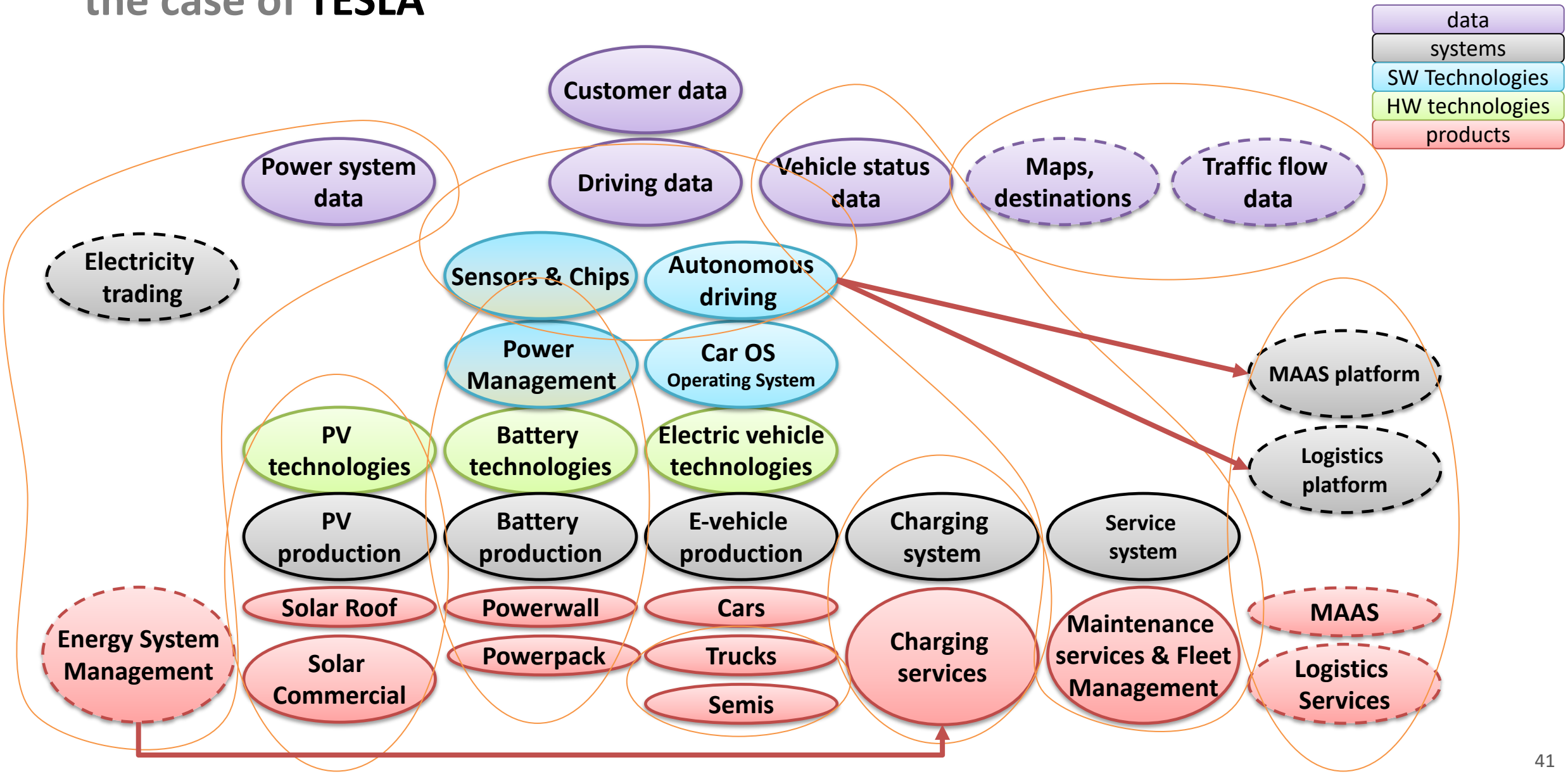

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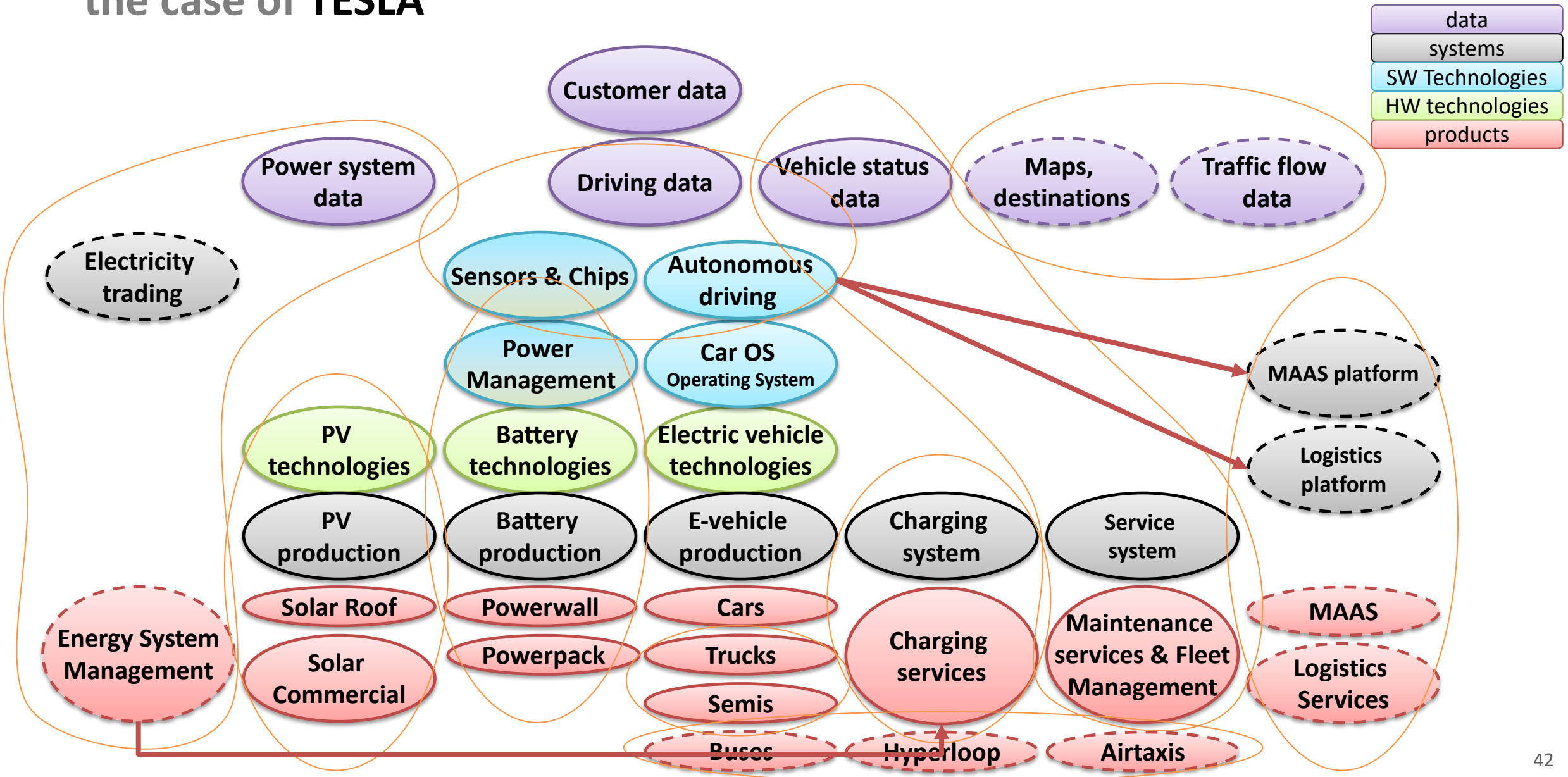

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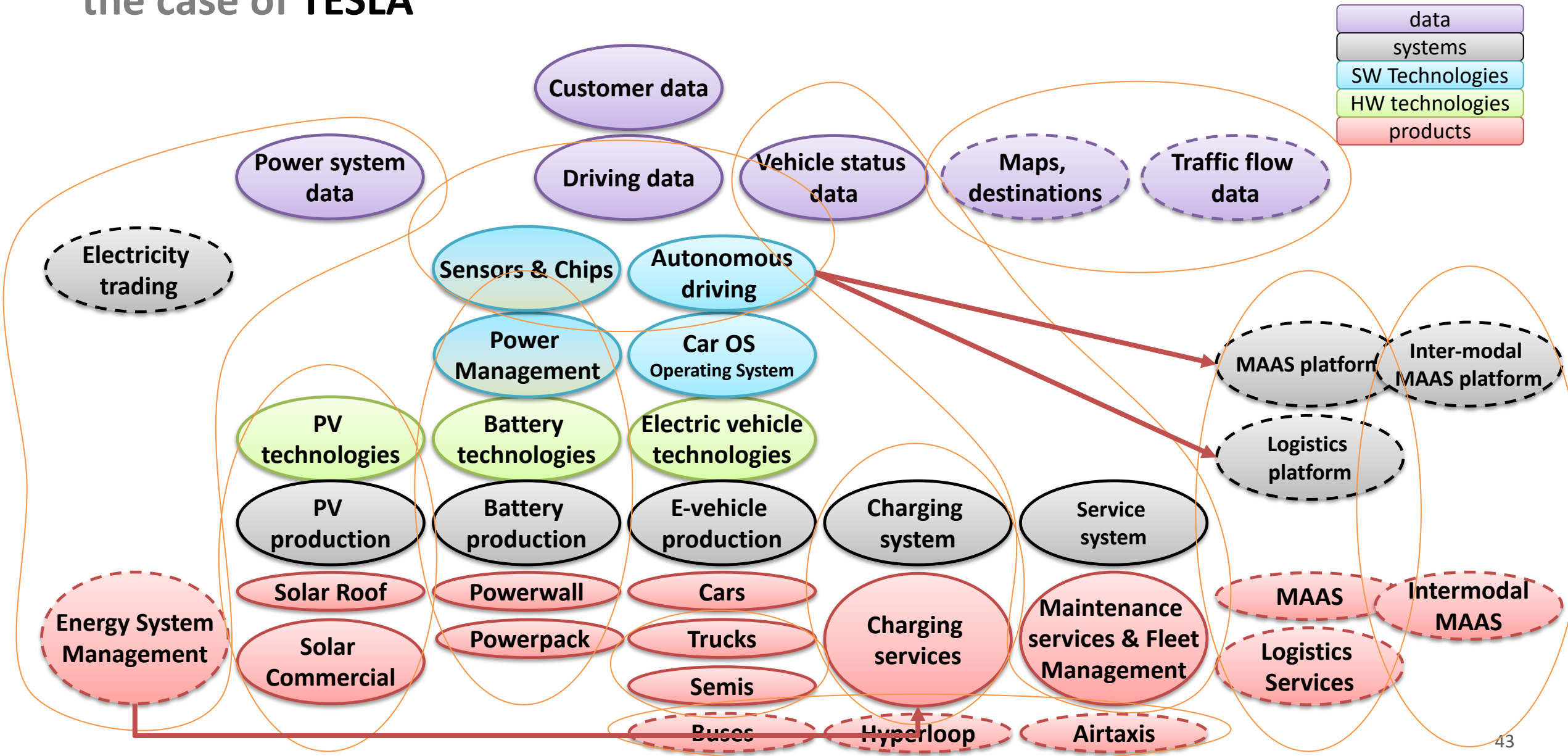

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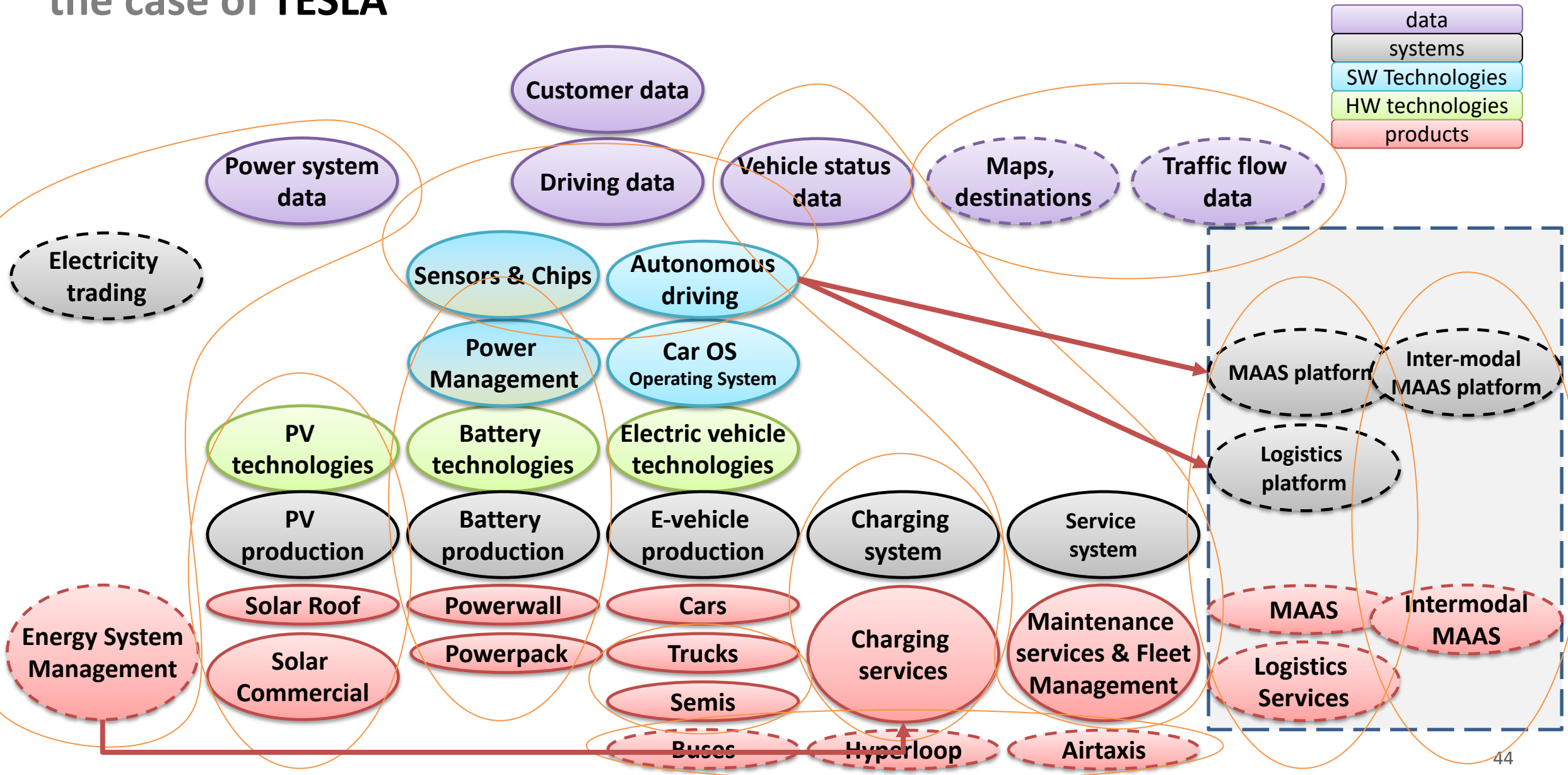

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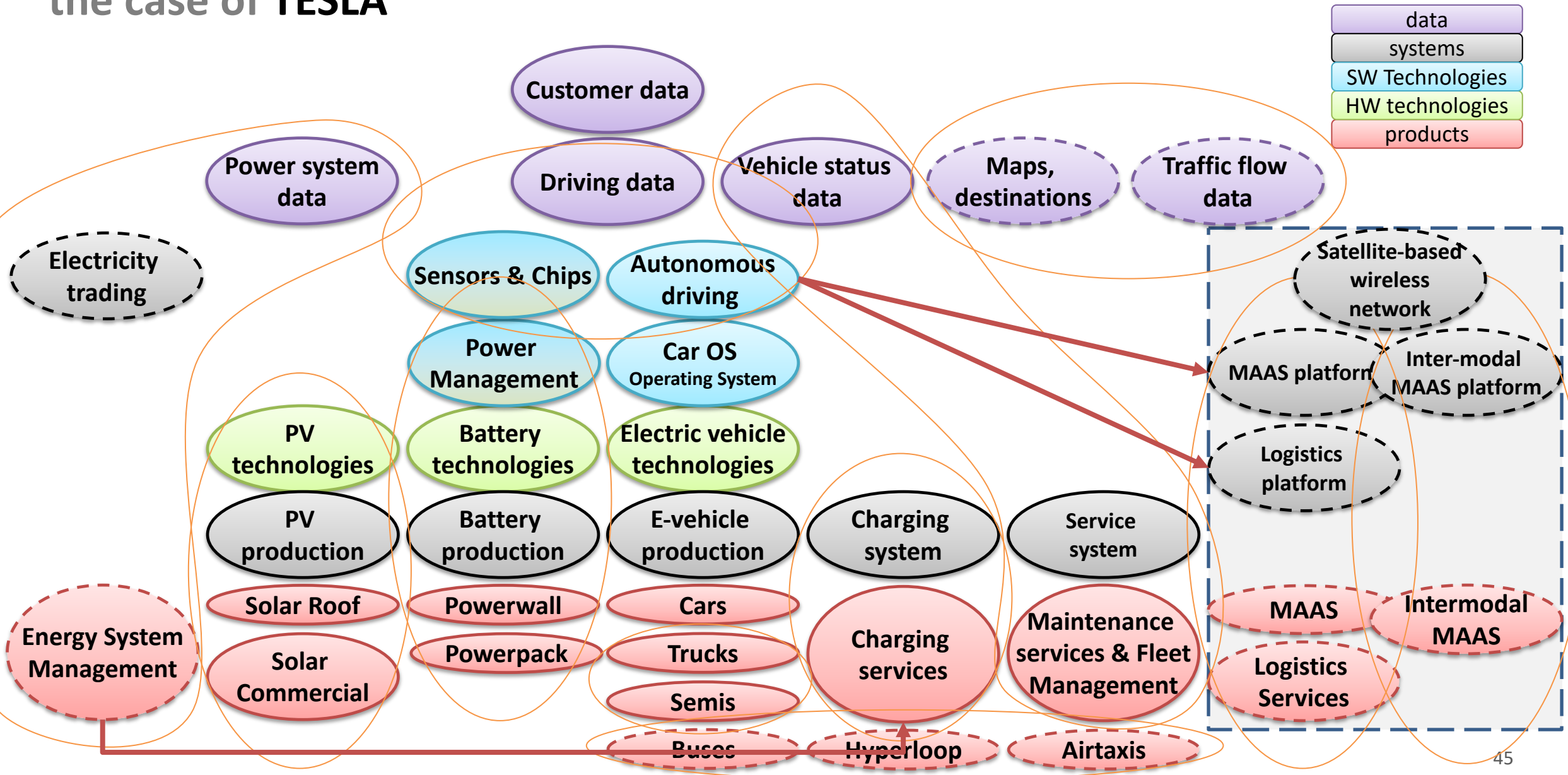

Digitalising the car:
Who controls the access to data?

	Vehicle	**Driving**	**Infrastructure**	**Routing**
	historical	*historical*	*historical*	*historical*
Actors	owner	driver	Infrastructure authorities, map editors	--
Hard-ware	car	car	roads, signs	--
Sensors	few	--	--	--
SW systems	--	--	--	--
Data	service booklet	--	paper map	--

Interests
in data

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	historical	*digital*	*historical*			*historical*		*historical*	
Actors	owner	owner	driver			Infrastructure authorities, map editors		--	
Hard-ware	car	vehicle	car			roads, signs		--	
Sensors	few	many	--			--		--	
SW systems	--	**monitoring, maintenance management**	--			--		--	
Data	service booklet	**History of status & maintenance**	--			paper map		--	

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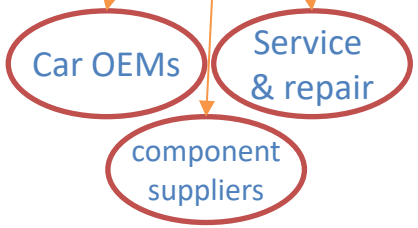

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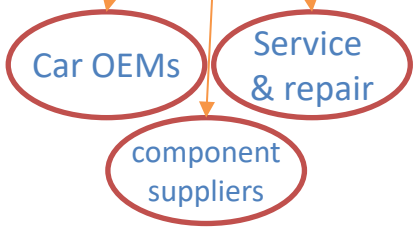
Interests in data



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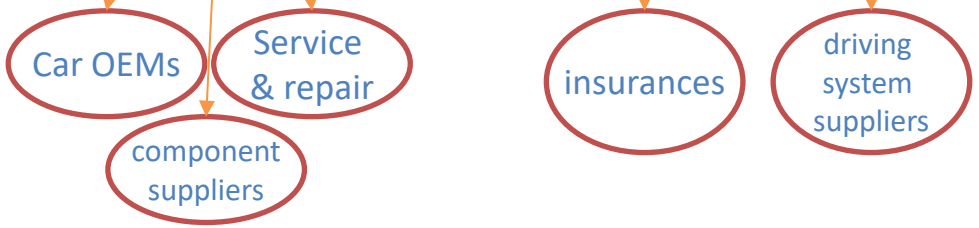

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Hard-ware	car	vehicle	car	car, actuators	car, actuators	roads, signs	roads, traffic management, charging points	--	
Sensors	few	many	--	many	many	--	many	--	
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Data	service booklet	**History of status & maintenance**	--	driving data - vehicle - **driver**	**driving data - vehicle**	paper map	**digital maps** - **static** - **dynamic** - **destinations**	--	

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Interests in data

Car OEMs

Service & repair

component suppliers

insurances

driving system suppliers

Public planning authorities

Digitalising the car: Who controls the access to data?

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Data	service booklet	**History of status & maintenance**	--	driving data - vehicle - **driver**	**driving data - vehicle**	paper map	**digital maps** - **static** - **dynamic** - **destinations**	--	

Interests in data

- Car OEMs
- Service & repair
- component suppliers
- insurances
- driving system suppliers
- Public planning authorities

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- Public planning authorities
- advertisers

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Actors	owner	owner	driver	driver	--	Infrastructure authorities, map editors	road authorities, map editors, charging providers	--	user
Hard-ware	car	vehicle	car	car, actuators	car, actuators	roads, signs	roads, traffic management, charging points	--	
Sensors	few	many	--	many	many	--	many	--	
SW systems	--	**monitoring, maintenance management**	--	driving assistance	**autonomous driving system**	--	**continuous mapping, charging**	--	**routing**
Data	service booklet	**History of status & maintenance**	--	driving data - vehicle - **driver**	**driving data - vehicle**	paper map	**digital maps** - **static** - **dynamic** - **destinations**	--	**user history**

Interests in data

Digitalising the car: Who controls the access to data?

	Vehicle		Driving			Infrastructure		Routing	
	historical	*digital*	*historical*	*digital*	*autonomous*	*historical*	*digital*	*historical*	*digital*
Actors	owner	owner	driver	driver	--	Infrastructure authorities, map editors	road authorities, map editors, charging providers	--	user
Hard-ware	car	vehicle	car	car, actuators	car, actuators	roads, signs	roads, traffic management, charging points	--	
Sensors	few	many	--	many	many	--	many	--	
SW systems	--	**monitoring, maintenance management**	--	driving assistance	**autonomous driving system**	--	**continuous mapping, charging**	--	**routing**
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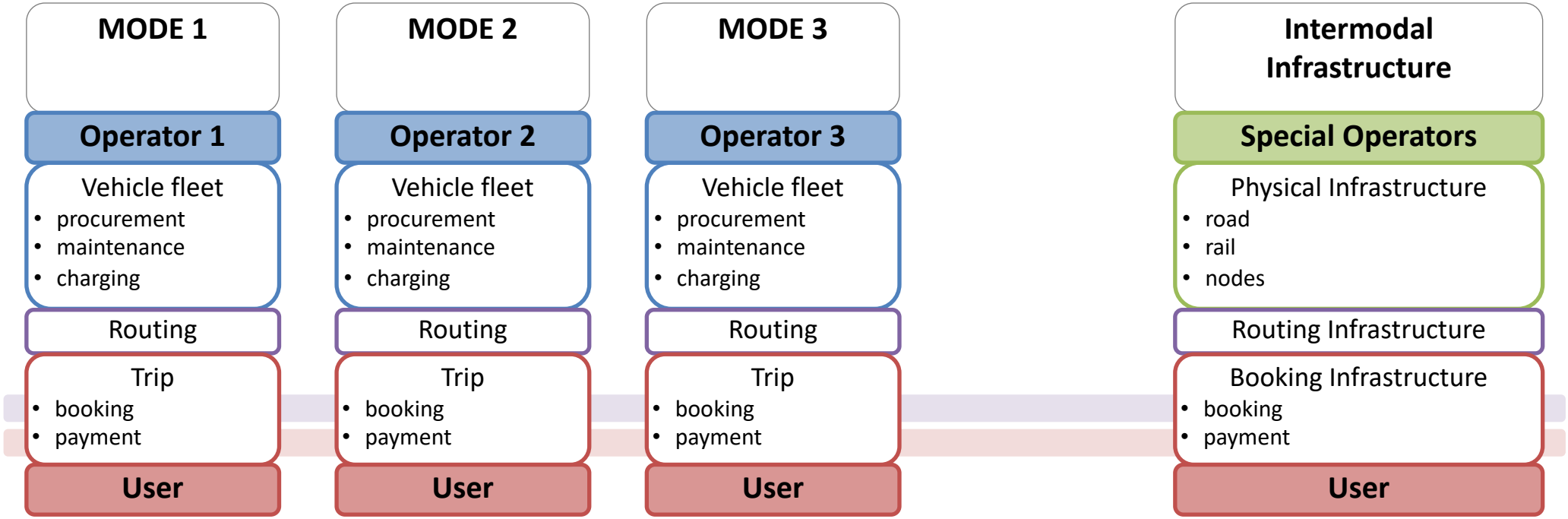
Interests in data

Car OEMs
Service & repair
component suppliers
insurances
driving system suppliers
Public planning authorities
advertisers

The threat:
Private monopolies for public functions

- Unregulated digitalisation of the transport sector will most probably lead to private monopolies/oligopolies dominating “public” transport systems
- Mobility and transport are basic functions of societies, private control cannot ensure public goals such as
  - efficient use of public space
  - social and spatial equity in mobility access
  - infrastructure planning respecting other spatial, social, environmental objectives
- Private companies will force public policies to abide by private interests
- Present regulative restrictions in transport markets made for old technologies will not be sustainable as they hinder innovations
- GDPR regulations, focused on individual data rights, put some limits to data abuse but cannot avoid the concentration dynamic

Digitalising mobility:
Who controls the integrated mobility system?



Publicly accessible mobility services are public transport

Digital services allow for a high degree of integration

Good interoperability requires strong integration rules and agents

Public control requires intense and flexible regulation

Data governance is key

Learning from regulation in finance, telecommunication, power sector, rail

- New technologies and ideologically driven "liberalisation" had lead to the threat of private monopolies
- Optimising and adapting complex market designs through legislation was too slow and too vulnerable by lobbyists (German EEG, European ETS)
- European and national regulation agencies are learning how to define a sophisticated market design, ensuring
  - the functioning of competitive markets
  - the pursuit of public goals
- Special agencies following basic rules, having a certain independence and staffed by specialised experts can handle the complexity of evolving technology based markets
- Advisory boards involving the civil society may provide additional control

How to regulate: Ideological preferences

direct control

state monopolies

Slow innovation

Bureaucracy risks to beat public interests

*competent & independent **regulation agency** must set and continually adapt rules (e.g. central banks, Bundesnetzagentur…)*

market design

contained markets
specific rules
market roles

competing companies in several roles
&
temporary concessions for natural monopolies

Competition

Innovation

Public interests respected through rules

minimal regulation

free market

unhindered use of network effects

destroys

private monopolies

Bureaucracy

Slowing innovation

Profit beats public interests

Transport sector regulation goals

- **Equitable and efficient use of public space**
- **Minimisation of harmful emissions (GHG, local pollution, noise)**
- **Equitable access to mobility and rapid connections**

- **Public control of natural or beneficial monopolies**
- **Competition and diversity in all markets**
- **Opportunities for small companies**

- **Innovation and innovation transfer**

Transport sector regulation instruments

- Ensure public control of monopolies through an appropriate combination of
  - public ownership
  - auction of concessions
  - data publication duties
  - interoperability rules
- Infrastructure to be publicly controlled includes
  - Physical infrastructure
    - Lines and nodes of transport networks
    - Access points, lines and nodes of electricity supply
    - Lines and nodes of key data networks
  - Digital Representation of these physical infrastructures and their use
  - Digital Representation of publicly accessible services and online service access
    - Availability, timetables, conditions, connectivity
    - Booking systems, tariffs, payments
- Install publicly controlled monopolies / oligo-polies where they make more efficient use of resources
  (e.g. last mile logistics)
- Define market roles and forbidden role combinations for avoiding monopolies / oligopolies
  (e.g. vehicle producer / transport mode operator / intermodal booking platform operator)
- Define markets and regulate data transfer between them
  (e.g. transport user data cannot be used for destination advertising)

A more transparent regulatory landscape could improve public acceptance and democracy raising the chances for effective climate policies