



GST 57 – Transfers

Formal Description

A transfer is the movement of matter, energy or information from one entity, process or system to another. Transfers enable causal interactions by conveying the physical means through which changes occur. They may occur continuously or intermittently and may involve the transfer of physical substances, energy or structured information. All processes and systems depend upon transfers to sustain their operation and to interact with their environments.

Plain English Explanation

Nothing can influence another entity without something being transferred between them. Whether we are considering a falling stone, an electrical circuit, a living organism or a conversation, causal interactions depend upon the movement of matter, energy or information.

When sunlight warms the ground, energy is transferred from the Sun to the Earth's surface. When water flows through a river, matter is transferred from one location to another. When a teacher explains an idea to a student, information is transferred through sound waves, writing or other physical media.

Transfers often occur together. A flowing river transfers water, but it also transfers energy through its movement and information about the shape of its channel. A moving vehicle transfers matter, energy and information simultaneously as it travels through its environment.

Processes can therefore be understood as organised patterns of transfers. Heating water involves the transfer of thermal energy. Photosynthesis involves the transfer and transformation of matter, energy and information. Manufacturing transforms incoming materials into finished products through many interconnected transfers.

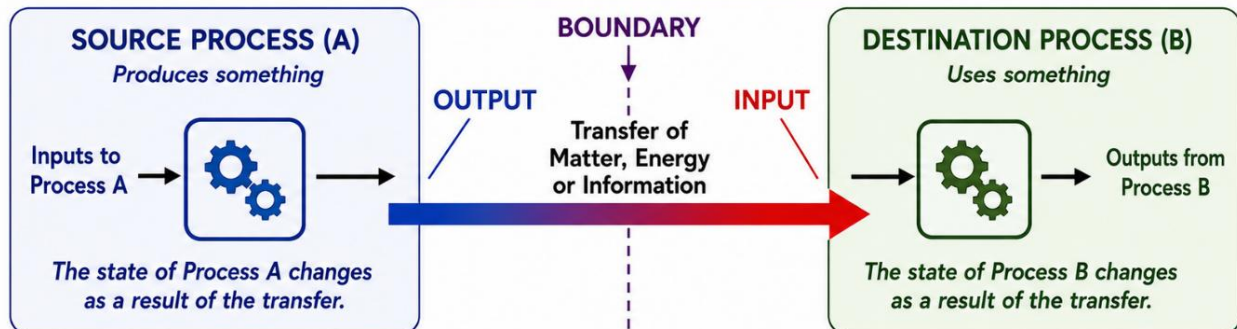
We often describe transfers using the terms inputs and outputs. These terms simply identify whether a transfer is entering or leaving a particular process or system. The transfer itself exists independently of the boundary we choose to draw. If we redraw the boundary, the same transfer may be described differently while remaining physically unchanged.

Recognising transfers helps us understand how causal influence moves through the world. In the next modules we shall examine how collections of entities become increasingly organised through configurations, assemblies and pre-systemic assemblies before eventually developing into systems.



TRANSFERS

Transfers occur between interacting processes.
Their description as “input” or “output” depends only upon the chosen boundary.



The transfer is
PHYSICALLY THE SAME. = What leaves Process A
as its **OUTPUT** ... = What enters Process B
as its **INPUT.** Only the perspective
(the boundary)
determines the labels.



KEY POINT

- Transfers are ontological – they exist in reality as physical exchanges.
- Inputs and outputs are representational – they depend only on the boundary we choose.
- Change the boundary, and what is “input” or “output” may change, but the transfer remains the same.

Examples

A domestic kettle receives electrical energy through its power cable. The electrical energy is transferred into the heating element, where it is transformed into thermal energy that heats the water. Steam and heat are then transferred from the kettle into the surrounding environment. When sending a text message, information is transferred between devices using electromagnetic signals. Although we often speak of “sending a message”, the underlying process consists of many physical transfers occurring through communication networks.

Provenance and Links

The concepts of matter and energy transfer are fundamental to physics, engineering and the natural sciences. Information transfer has become equally important through developments in information theory, communication engineering and systems science. General Systems Theory recognises transfers as the physical basis of interaction, linking entities, processes and systems through the movement and transformation of matter, energy and information.



Practical Exercise

Choose a familiar process such as making a cup of tea, driving a car, sending an email or growing a plant.

Identify the principal transfers of matter, energy and information involved. For each transfer, identify its source and destination, and explain how it contributes to the overall process.

Finally, redraw the system boundary around a different part of the process. Describe how the same transfers may now be classified differently as inputs or outputs while remaining physically unchanged.