Hub or Switch

Why is a switch so much better than a hub and what is the difference between these products? We have already ascertained that it was the hub that made the installation of star coupled networks possible, and together with Ethernet, made structured cable systems popular. The hub does not have an advanced design, everything sent to one port is transferred to the other ports. This means that everyone hears what everyone sends and everyone is in the same collision domain.

On the other hand, a switch is more intelligent, either through processors or through specially designed integrated circuits. This creates the possibility to control and process data received on a port. The switch learns what equipment is connected to what port and this is stored in the switch's MAC-address memory. There are two types of switch, Cut-through and Store-and-forward. The Cut-through switch examines the destination address and sends data to the destination port. This results in a collision if the port is used by other traffic where the most recent packet is lost. These switches are very fast. The Store-and-forward switch copies the received packet and places this in the buffer before it localises the destination port and only sends it forward when the port becomes free. Consequently the packet is not lost. Data can also be prioritised; the network can be divided up into virtual LANs, etc.

The list below shows some of the differences between a hub and switch.

Hub	Switch
Half duplex communication.	Half duplex or Full duplex (HDX/FDX).
Increases the collision domain.	Segments the network.
	Bandwidth as required (self-learning system).
The whole network shares the bandwidth.	Store and forward (control of the packet before it is forwarded).
Low bandwidth utilisation due to CSMA/CD.	Learns MAC addresses (who is connected where).
Faster than a Switch (less latency).	Old addresses are forgotten (time out on the MAC address buffer).
	Flow control for FDX and HDX.
	Packet buffer on port level.
	QoS, prioritisation of data (high priority data is placed first in the packet buffer).
	Virtual network VLAN (virtually connect together specific ports).
	Gbit-switches (powerful switches with a high capacity).

The advantage we usually emphasize is that a switch segments the network (switched Ethernet), which eliminates collisions.