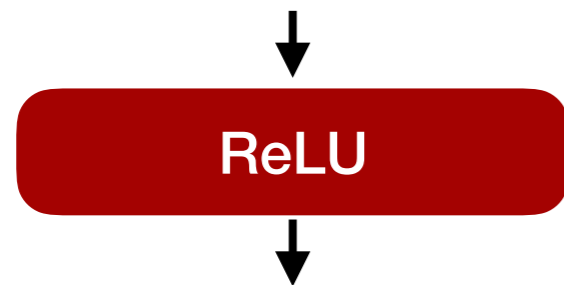


# Non-linearities

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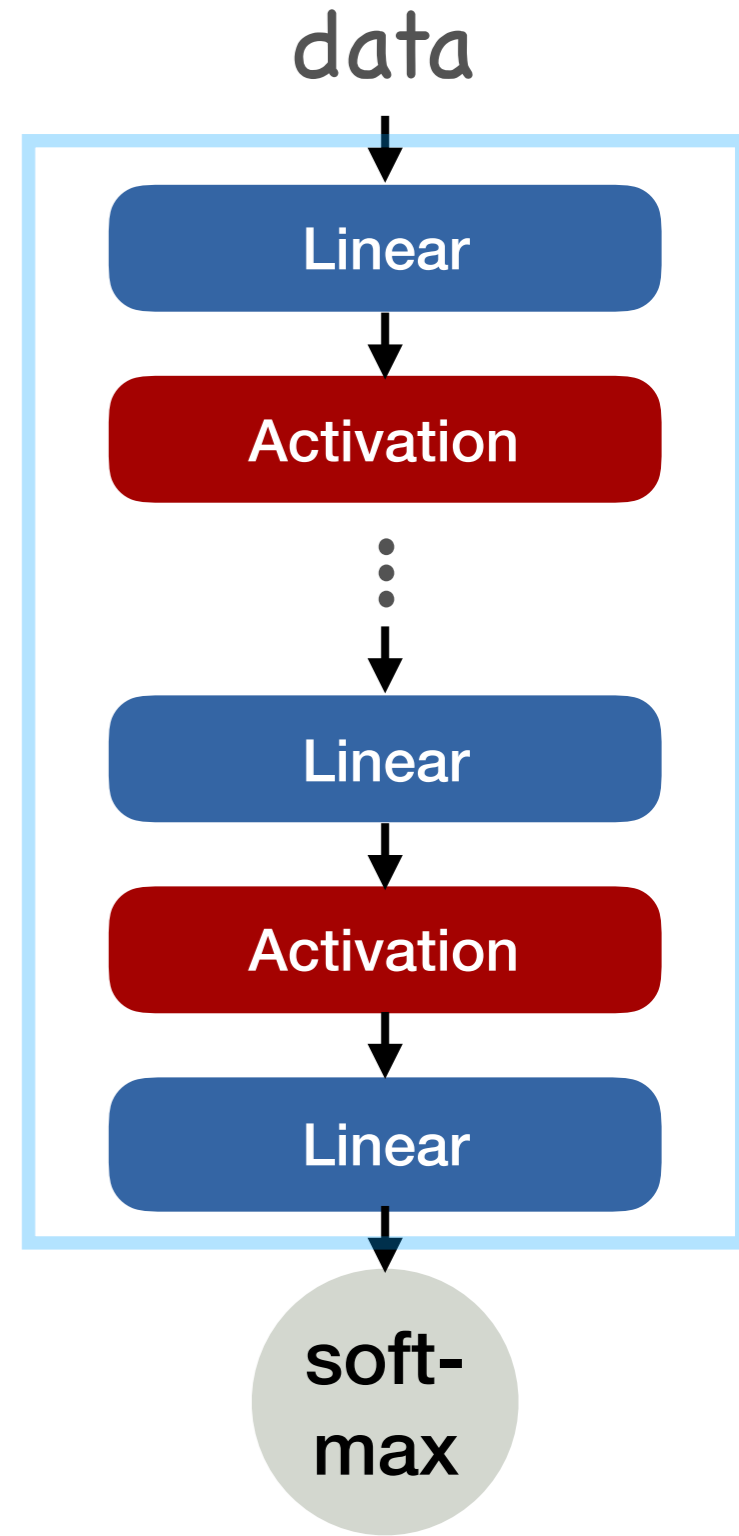
# Non-linearities

- Rectified Linear Unit
  - $\text{ReLU}(x) = \max(x, 0)$
- Non-linear and differentiable almost everywhere



# Deep networks

- Alternates linear and non-linear layers



# A simple example

- “Shallow” network
- Dog paw or not?



# Deep networks

- Class of continuous functions  $f_{\theta} : \mathbf{X} \rightarrow \mathcal{O}$
- Parameters  $\theta$
- Can approximate any continuous function

