

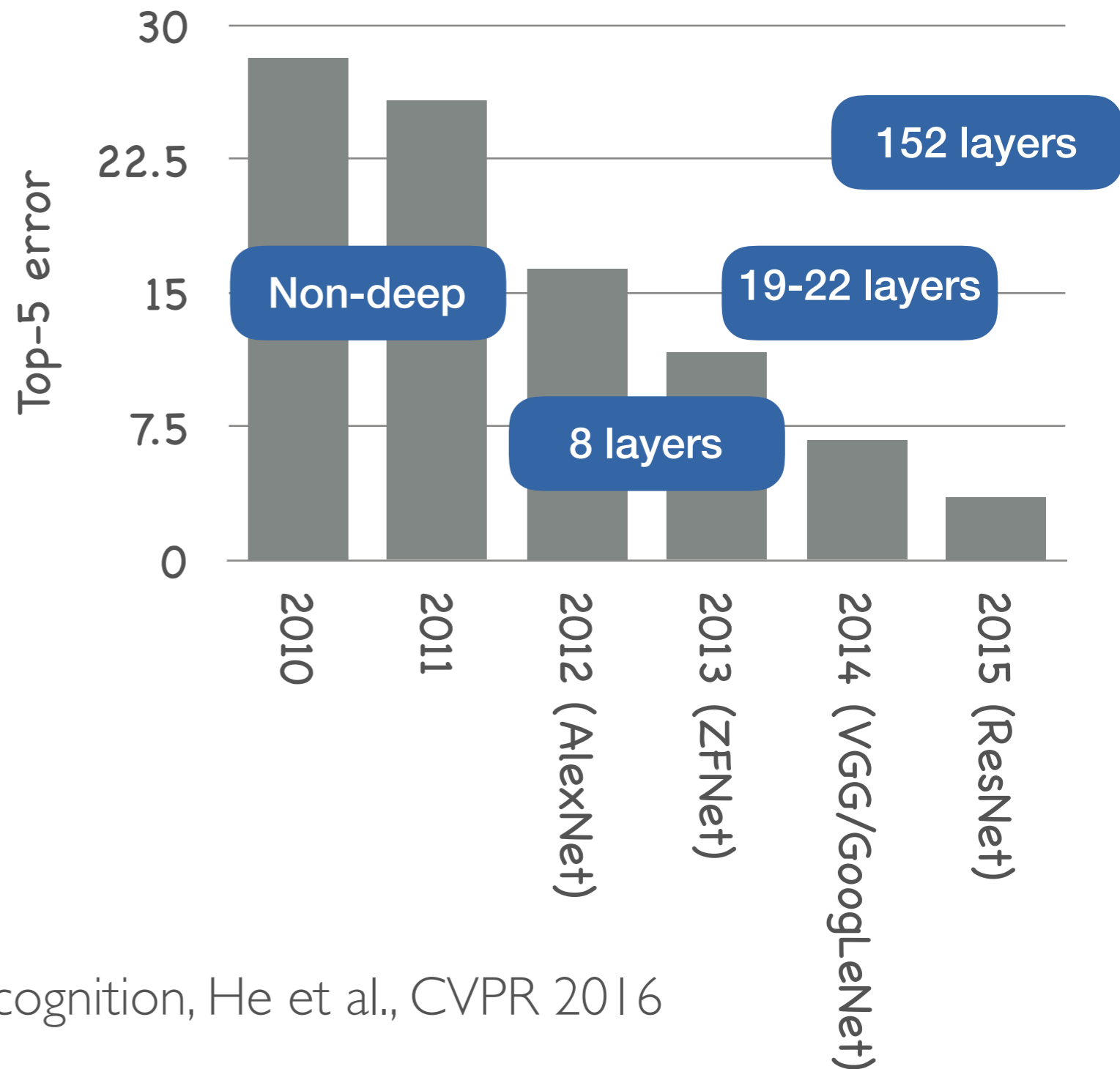
Case study: Residual Networks

© 2019 Philipp Krähenbühl and Chao-Yuan Wu

Residual Networks

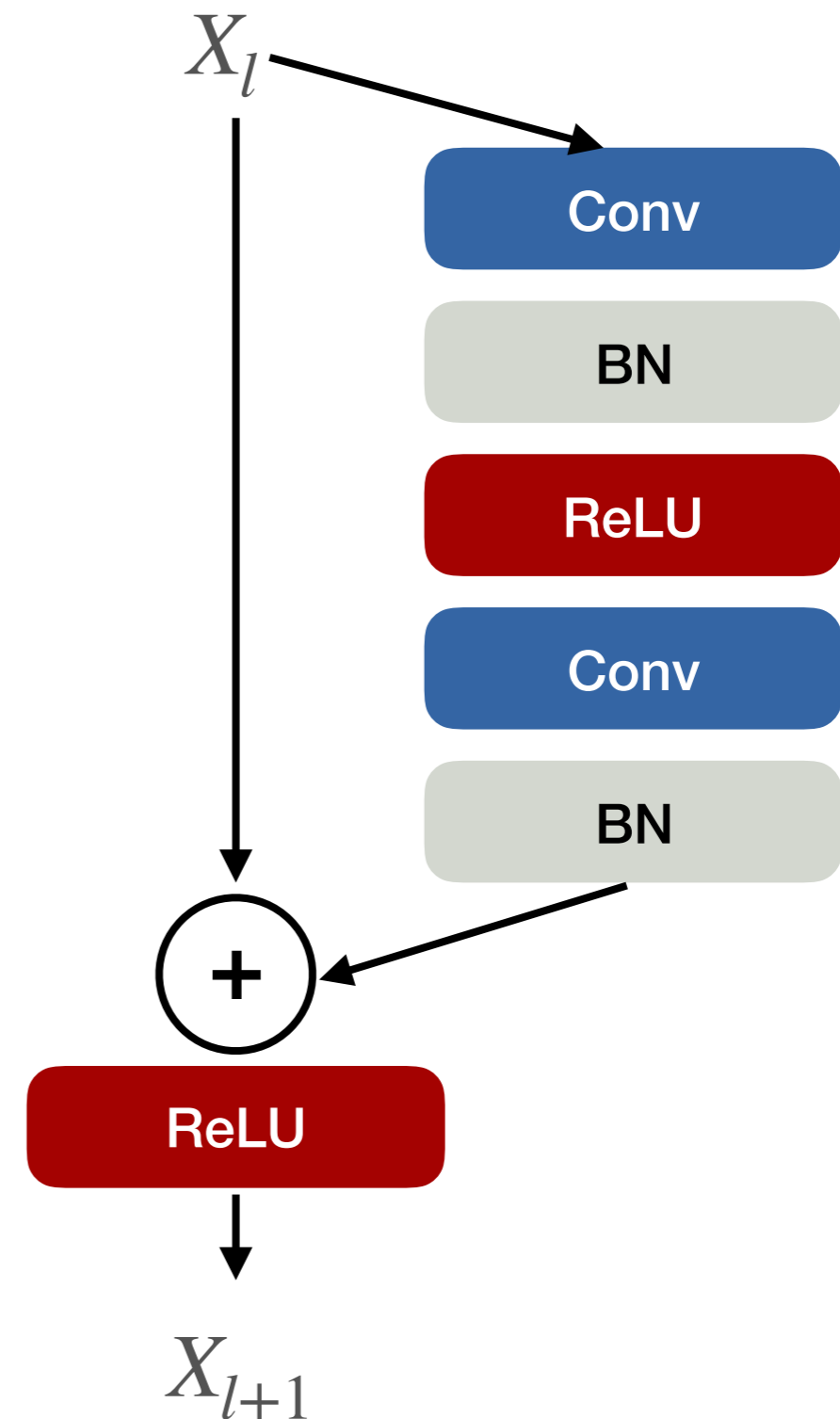
ImageNet challenge

- Uses residual connections to build deeper networks
- Activation maps are additive



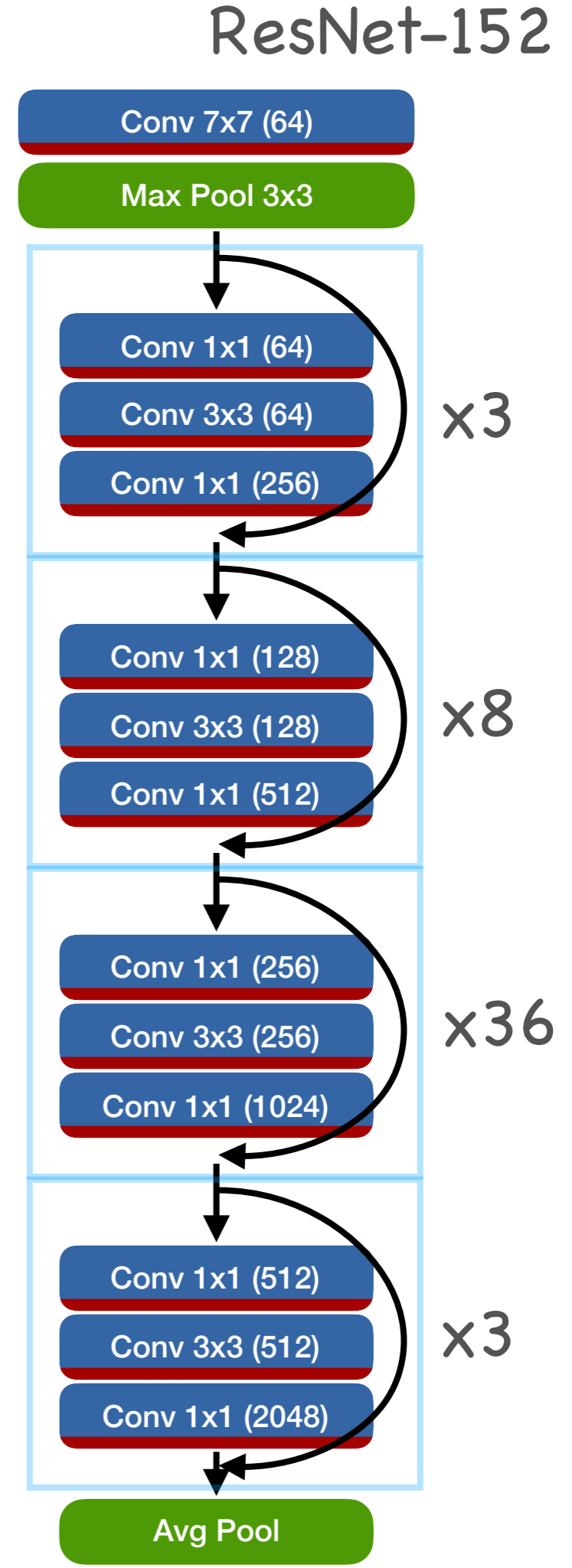
Residual blocks

- Add shortcut connections for gradients
- Identity
- Strided 1x1 convolution



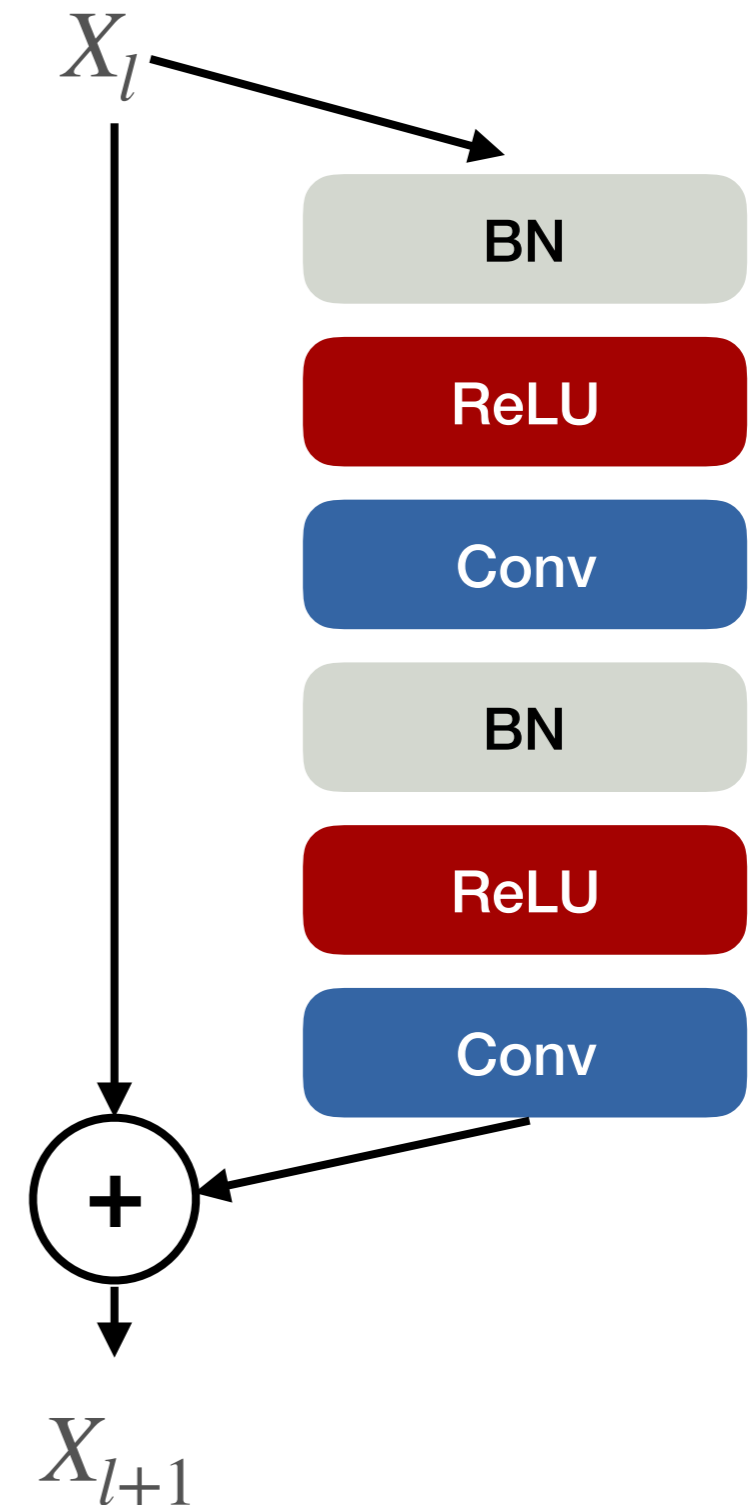
ResNet

- Multiple variants
- ResNet-18, ResNet-34, ResNet-50, ResNet-101, ResNet-152, ResNet-1001



Pre-activation block

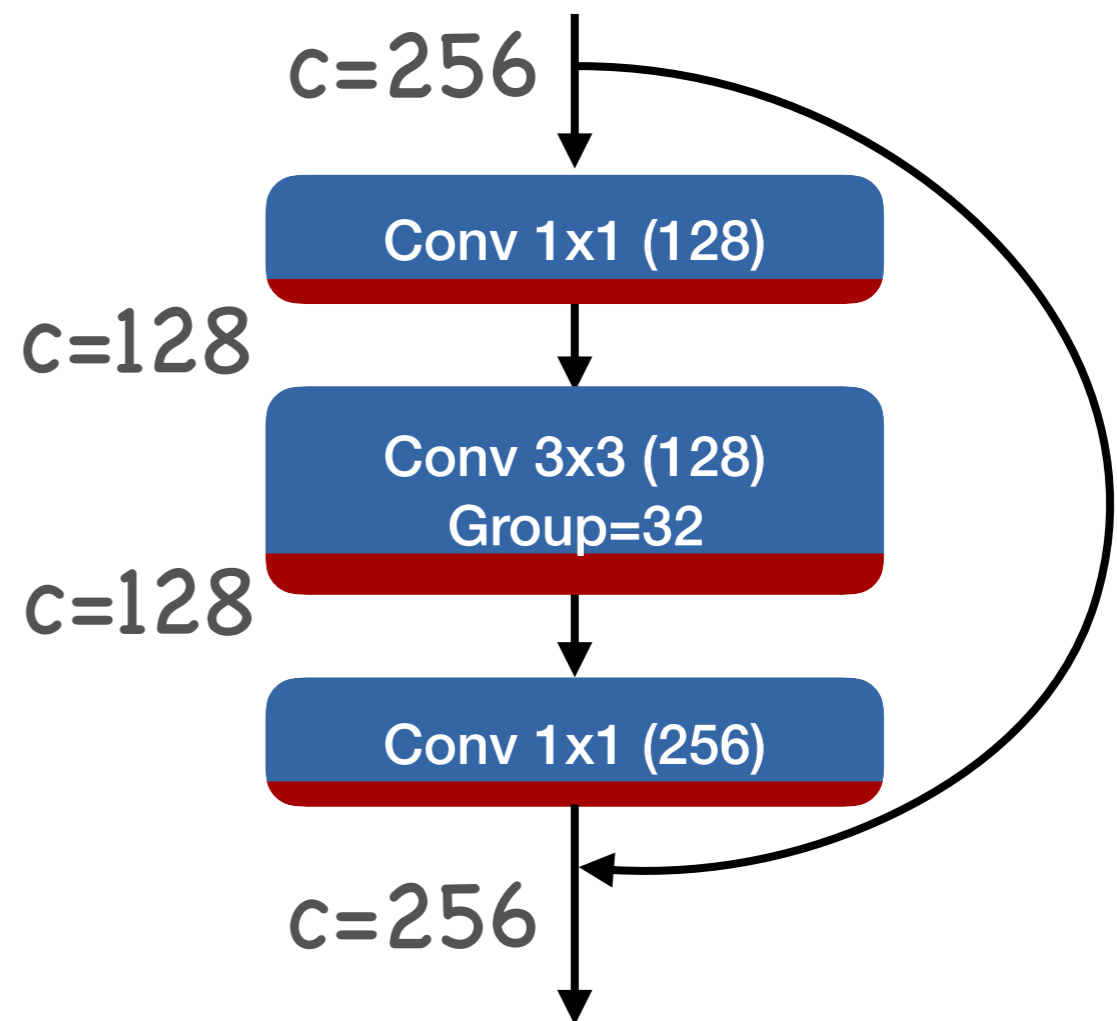
- Pure identity connections
- Allows for deeper networks
- Trains better



Identity Mappings in Deep Residual Networks, He et al., ECCV 2016

ResNeXt

- Group convolutions in residual blocks
- More channels
- Fewer parameters / computation

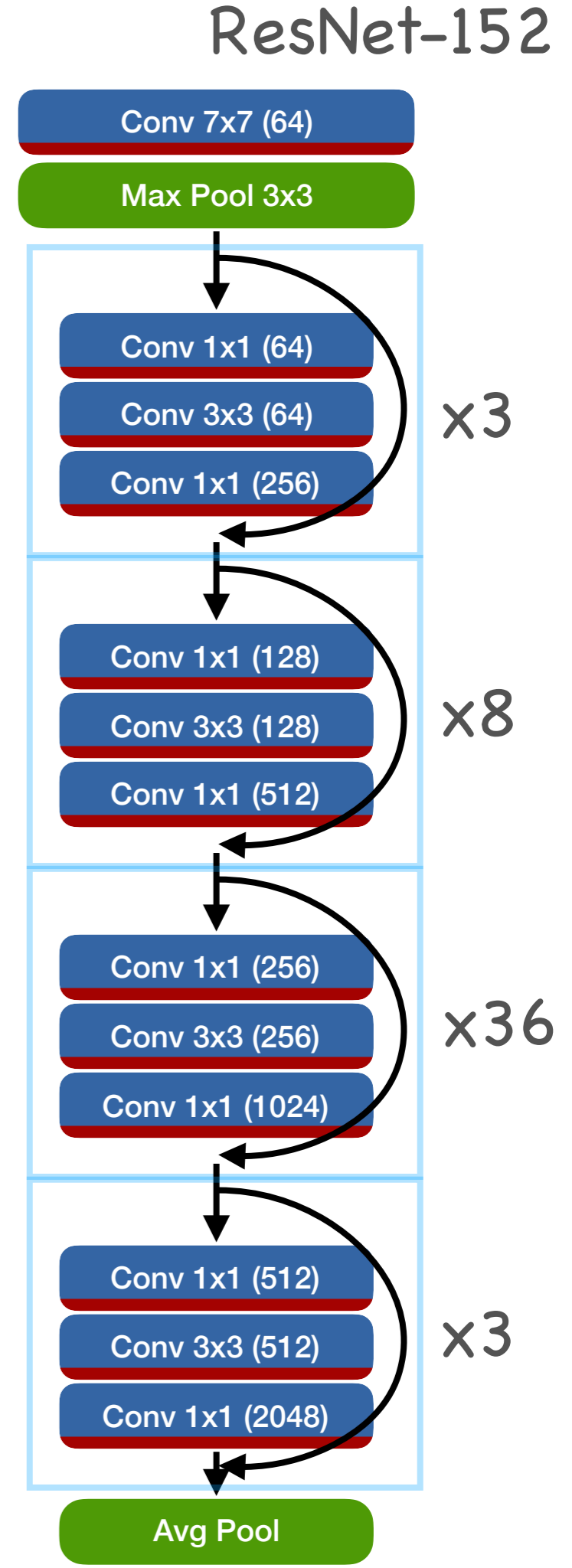


Aggregated Residual Transformations for Deep Neural Networks, Xie et al., CVPR 2017

Stochastic depth

- Layer “dropout”
- Less overfitting

Deep Networks with Stochastic Depth, Huang et al.,
ECCV 2016



Uses of ResNet

- Anywhere in computer vision

