IP Architecture

Simple Architecture (Small number of states)
IP Architecture

Complex Architecture (Large number of states)
Matrix-Multiply Architecture

--- Matrix Multiplication
for i in 0 to 7 loop
  for j in 0 to 7 loop
    Sum := 0;
    for k in 0 to 7 loop
      A := BlockA( i, k );
      B := BlockB( k, j );
      P := A * B;
      Sum := Sum + P;
      if( k = 7 ) then
        BlockC( i, j ) := Sum;
      end if;
    end loop;
  end loop;
end loop;

--- Starting
wait until Start = '1';
Done <= '0';

--- Read Input Data
for i in 0 to 7 loop
  for j in 0 to 7 loop
    wait until Clk = '1' and Clk'event;
    BlockB( i, j ) := Din;
  end loop;
end loop;

--- Finishing
wait until Clk = '1' and Clk'event;
Done <= '1';

--- Output Data
for i in 0 to 7 loop
  for j in 0 to 7 loop
    wait until Clk = '1' and Clk'event;
    Dout <= BlockC( i, j );
  end loop;
end process;
--- Matrix Multiplication
for i in 0 to 7 loop
  for j in 0 to 7 loop
    Sum:=0;
    for k in 0 to 7 loop
      A := BlockA( i, k );
      B := BlockB( k, j );
      P := A * B;
      Sum := Sum + P;
      if( k = 7 ) then
        BlockC( i, j ) := Sum;
      end if;
    end loop;
  end loop;
end loop;
--- Finishing
wait until Start = '1';
Done <= '0';
--- Output Data
for i in 0 to 7 loop
  for j in 0 to 7 loop
    wait until Clk = '1' and Clk'event;
    Dout <= BlockC( i, j );
  end loop;
end loop;