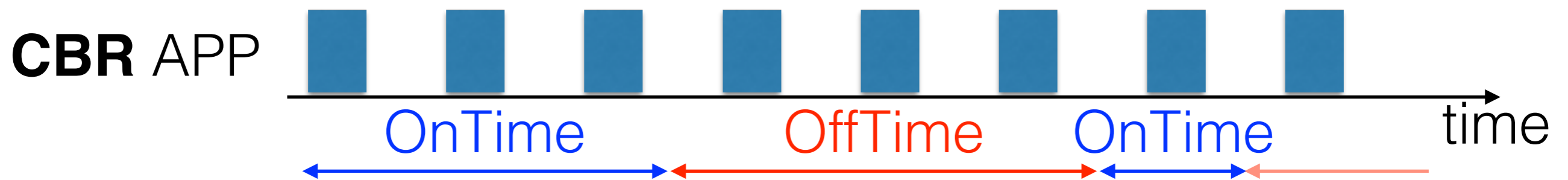


# Lecture 12:

## ns3: On-Off Application

# On-Off Application

- On-Off Attributes
  - DataRate
  - PacketSize
  - OnTime
  - OffTime



# Example

- **file:** pm-ex7.cc
- On-Off Application: **OnTime** vs. **OffTime**
  - Datarate = 512 Kbps
  - Packet Size = 1500 Bytes
  - Fixed **OnTime** = 1 s  
[Constant Random Variable]
  - Increasing **OffTime** from 0 to 1 s, stepping by 0.1 s.  
[Exponential Random Variable]

# Adding dOffTime Variable

- For receiving the OffTime specified from command line

```
double dOffTime = 0.00;

CommandLine cmd;
cmd.AddValue ("nCsma", "Number of \"extra\" CSMA nodes/devices", nCsma);
cmd.AddValue ("nWifi", "Number of wifi STA devices", nWifi);
cmd.AddValue ("verbose", "Tell echo applications to log if true", verbose);
cmd.AddValue ("dOffTime", "Tell the offTime of OnOff Application", dOffTime);
```

# Creating OSS String

- Configuring the OffTime attribute by using **dOffTime**

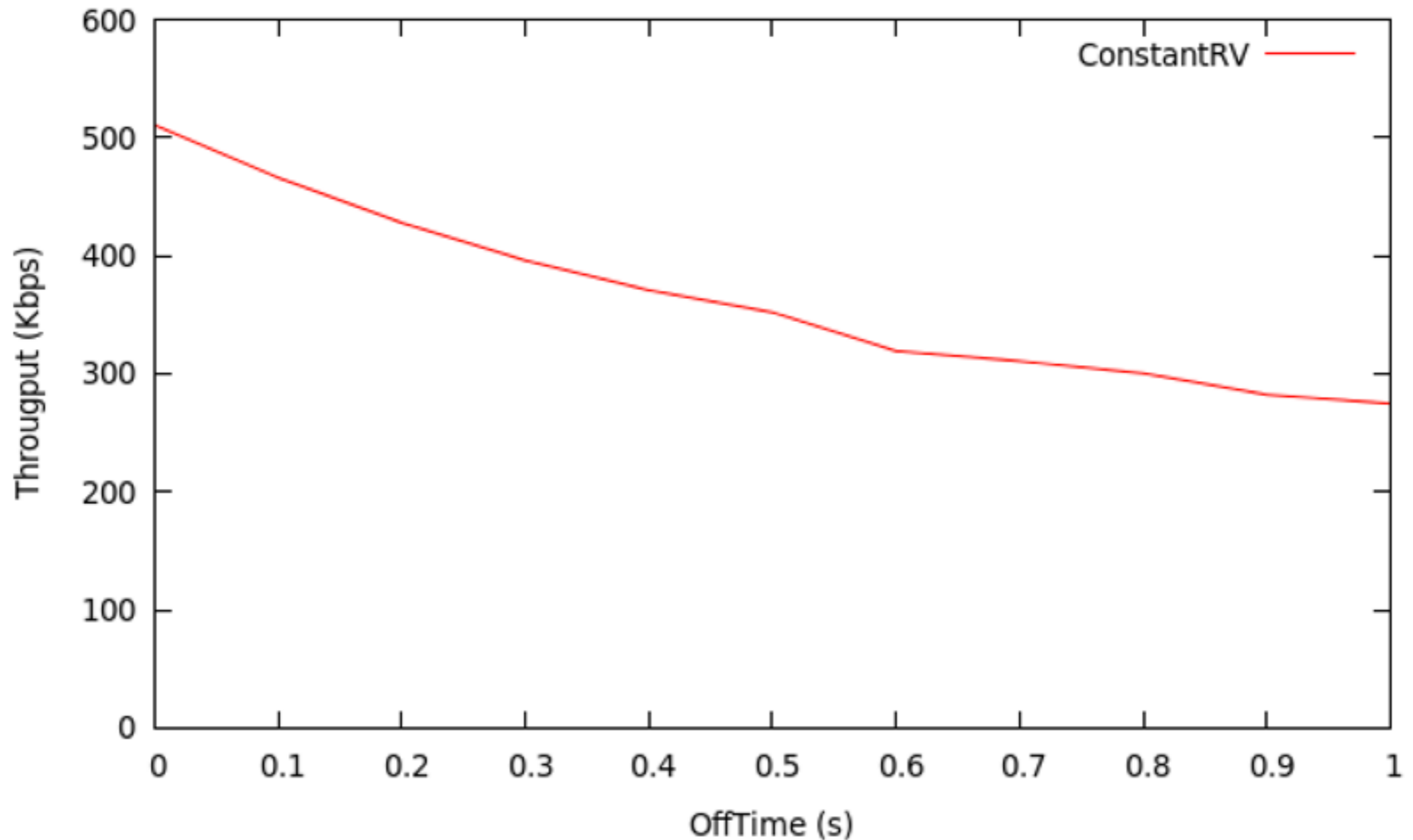
```
onoff.SetAttribute("OffTime",StringValue("ns3::ConstantRandomVariable[Constant=0]"));
```



```
//OffTimeVariable  
std::ostringstream ossOffTime;  
ossOffTime << "ns3::ConstantRandomVariable[Constant=" << dOffTime << "];"  
onoff.SetAttribute("OffTime",StringValue(ossOffTime.str()));
```

# Running pm-ex7.cc

```
./waf --run "pm-ex7 --nWifi=1 --dOffTime=0.0"
```



# Constant vs. Exponential Random Variable (OffTime)

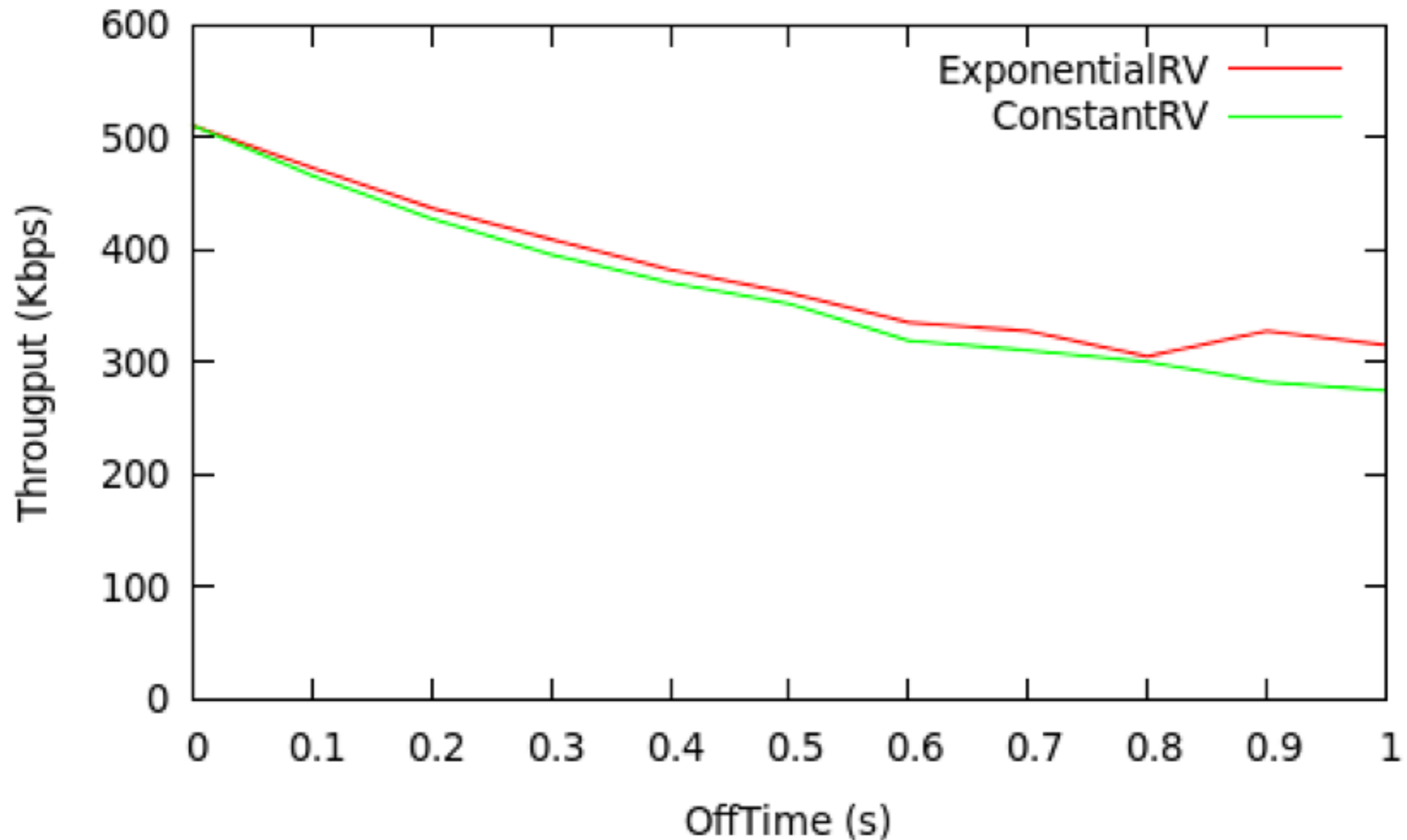
- Constant Random Variable: [pm-ex7.cc](#)

```
//OffTimeVariable  
std::ostringstream ossOffTime;  
ossOffTime << "ns3::ConstantRandomVariable[Constant=" << dOffTime << "];"  
  
onoff.SetAttribute("OffTime",StringValue(ossOffTime.str()));
```

- Exponential Random Variable: [pm-ex8.cc](#)

```
//OffTimeVariable  
std::ostringstream ossOffTime;  
ossOffTime << "ns3::ExponentialRandomVariable[Mean=" << dOffTime << "];"  
  
onoff.SetAttribute("OffTime",StringValue(ossOffTime.str()));
```

# Constant vs. Exponential Random Variable (OffTime)





# Random Variables

- built-in pseudo-random number generator (PRNG)
- by default, ns-3 simulations use a fixed seed
- to obtain randomness across multiple simulation runs
  - to set seed — `ns3::SeedManager::SetSeed()`
  - to set run number — `ns3::SeedManager::SetRun()`

# Random Variables

```
SeedManager::SetSeed (3); // Changes seed from default of 1 to 3
SeedManager::SetRun (7); // Changes run number from default of 1 to 7
// Now, create random variables
UniformVariable x(0,10);
ExponentialVariable y(2902);
...
```