Gamma Distribution in EIS
Fundamental Drivers of Safety Stock Requirements

Safety Stock (SS) is based on:
- Forecast error
- Service level target

Forecast error is modeled using Gamma distribution
- Gamma can be asymmetric or symmetric
- If symmetric, Normal Distribution can be used

Service level target can be expressed using
- Non-stockout probability
- Fill rate
Gamma Distribution For Forecast Error

- Provides accurate model of forecast error
- Can model skewed or symmetric distribution
Gamma Distribution is more Robust than Normal
Computing Safety Stock With Gamma Distribution

Planning for one product/one location/one period with instantaneous lead time
Forecast: 100 +/- 25, Forecast Error Distribution: Gamma
Service Level Target: 95% Non-stockout probability
Calculating the right safety stock requires the numerical integration of the Gamma cumulative distribution function
Target Inventory Position = 145 units, Safety Stock = 45 units

Filled area represents 95% of total
Classical Formula For Computing Safety Stock

- Planning for one product/one location/one period with instantaneous lead time
- Forecast: 100 +/- 25, Forecast Error Distribution: Normal
- Service Level Target: 95% Non-stockout probability
- Classical Formula: Safety stock = z (95%) * σ = 1.64 * 25 = 41
- Target Inventory Position = 141 units, Safety Stock = 41 units
Thank you