Does GRP & GRIP Fit Great Plains Agriculture?

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1

What is GRP & GRIP

- GRP is a "put option" on expected county yield
- GRIP is a "put option" on county revenue
- Farmer has the basis risk, difference between county yield % change and farm yield % change

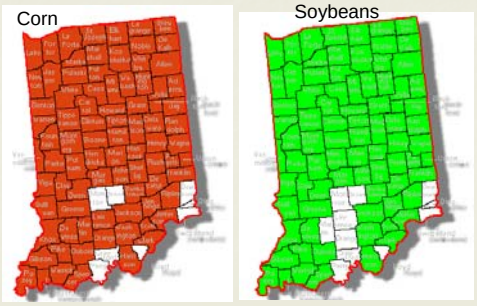
2

Where is GRIP & GRP Selling?

- Eastern Corn Belt
- Drought or excess moisture (tiled drained?) are major risk
- Very little hail risk with rates under a dollar
- APH maybe over rated?

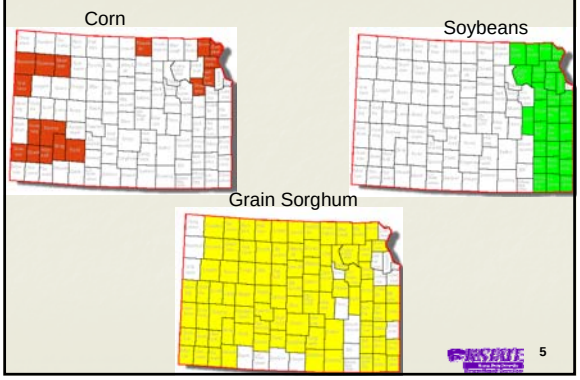
3

Indiana GRIP, provided by NCIS



4

Kansas GRIP, provided by NCIS



5

Does GRP & GRIP Fit Great Plains Agriculture?

- GRP/GRIP Does Provide "Reasonable" Protection for:
  - Drought
  - Freeze
  - Excess Moisture

6

Does GRP & GRIP Fit Great Plains Agriculture?

- GRP/GRIP Does NOT Provide "Reasonable" Protection for:
  - Hail
  - Flood
  - No Prevented planting
  - No Re-plant
  - No Quality Loss adjustment
  - Any "spot" Loss

7

Does GRP & GRIP Fit Great Plains Agriculture?

- If APH is low caused by multiple year crop losses
- Low APH causes low guarantees and higher premium costs
- If the APH is real low then there is very little protection. GRP is based on at least a 30 year history, so coverage maybe much higher with lower premium.

8

GRP Yield Basis Risk

- No moral hazard but what about adverse selection?
- What if farm average yield is greater than county average yield?
- If the GRP measures a 50% loss and the farmer suffers a 50% loss then the loss is covered.
- Works for farmers with average yields above or below county average.

9

Growers electing GRP probably should consider the following

- Purchase hail insurance?
- Purchase a lower GRP deductible because county yields vary less than farm yields
- Purchase more liability ($ protection)
- GRIP will probably be preferred to GRP

10

GRP "Math 101"

- Trend adjust county yield
- Expected county yield was 127 bu.
- 10 year average yield was 122 bu.

11

GRP "Math 101"

- Trigger Yield = Expected County yield * % coverage
- 115 bu. Trigger yield= 127.8 * 90%
- Liability = GRP Price Election* Expected Yield
- $293.94 = $2.30 * 127.8 bu.
- Maximum Protection = Exp. Co. Liability * max 150%
- $441 = $293.94 * 150%
- Max = 100% or $441; Min 60% or $265

12

GRP "Math 101"

- GRP payment = (Trigger yield- current year county yield/ trigger yield) * Liability (selected $ protection)
- County has a 25.3% loss from 127.8 expected bu. and farmer suffers a 51% yield loss
- GRP = (115 – 95.5) / 115 = 17% * $265 = $45.05
- MPCI = 125 * 75% bu. Guarantee – 61.2 bu. production = 32.6 bu. * $2.30 = $74.98

GRP "Math 101"

- The increase coverage up to 150% and lower deductible can be used to manage basis risk.
- GRP = (115 – 95.8) / 115 = 17% * $294 *150% = $441 = $74.97
- MPCI = 125 * 75% bu. Guarantee – 61.2 bu. production = 32.6 bu. * $2.30 = $74.98

14

GRIP "Math 101"

- Group Risk Income Protection price based on the last 5 trading days in February for December corn.
- Harvest price is the November average of December corn; October average for grain sorghum
- Grain sorghum prices adjusted by USDA's GS/corn price ratio
- GRIP uses the GRP expected county yield for expected county revenue.
- Like GRP, farmer can suffer a total loss and receive no payment, maybe a lender concern.

15

GRIP "Math 101"

- Expected County Revenue = Expected County yield * Feb Price
- ECR= 127.8 * $2.30= $293.94
- Maximum Liability = Exp. Co. Rev. * max 150%
- $441 = $293.94 * 150%
- Max = 100% or $441; Min 60% or $265

16

GRIP-HRO "Math 101"

- GRIP payment = (Trigger revenue- current year county revenue/ trigger revenue) * selected $ protection
- County has a 25.3% loss from 127.8 Expected bu. And farmer suffers a 51% yield loss
- GRIP = ((127.8 * $2.30 * 90%) – (95.5 * $2.60)) / $264.55 = 6.1% * $ 264.55 = $16.14
- MPCI = 125 * 75% bu. Guarantee – 61.2 bu. production = 32.6 bu. & $2.30 = $74.98

17

GRIP-HRO "Math 101"

- Harvest Revenue Option (GRIP-HRO) factor = Greater of Harvest price/Spring Price, 1.0
- 1.13 = $2.60/$2.30
- County has a 25.3% loss from 127.8 Expected bu. and farmer suffers a 51% yield loss
- GRIP-HRO= ((127.8 * $2.60 * 90%) – (95.5 * $2.60)) / $299.05 = 17% * ($293.94 * 132.8% * 1.13) = $74.98
- MPCI = 125 * 75% bu. Guarantee – 61.2 bu. production = 32.6 bu. & $2.30 = $74.98

18

GRIP "Math 101"

- Increase coverage up to 150% of expected revenue and lower deductible can be used to manage basis risk.
- In Kansas, Wheat prices are more likely than corn prices to increase with a county yield loss.

19

GRP/GRIP Summary

- If most of the county is dryland, then an irrigated grower may collect more than the loss
- GRP protection may be preferred if APH is low or APH is overrated
- Farm land is spread out across the county or if farm sets in multiple counties

20

GRP/GRIP Summary

- Little / no Protection for Hail, wind, flood or other spot losses
- No Prevented Planting or Re-plant Protection
- GRP insured growers worried about Rust may want to change to APH
- Farmer can suffer a total loss and receive no payment, maybe a lender concern.

21

McPherson County, KS Wheat GRP and GRIP Historical Simulated Indemnity Payments based on 30 Years of Trend Adjusted Yields (No Practice Specified)

RMA's 2005 Expected County Yield 44.8
KSU's 2005 Expected County Yield 45.8
150% Maximum Liability

Year	County Yield	Planted Yield	Trend Adj. Expect Yield	90% Cov GRP Pymt Rate	APH[1]	GRP Pymt	5.30% GRP Prem	Plant[2] Price	Harvest Price	90% Coverage GRP Pymt Rate	GRIP Pymt	6.25% GRIP[3] Prem	90% GRIP-HRO Pymt Rate	GRIP-HRO Pymt	9.38% GRIP-HRO[3] Prem
1980	35	33.2	33.8	0.0%	3.50	0.00	9.41	4.25	4.23	0.0%	0.00	13.49	0.0%	0.00	20.24
1981	27	24.7	34.6	20.7%	3.50	37.64	9.62	4.88	4.20	31.8%	80.53	15.83	31.8%	80.53	23.75
1982	35	34.3	33.5	0.0%	4.50	0.00	11.99	4.56	3.57	11.0%	25.19	14.33	11.0%	25.19	21.50
1983	37	30.9	34.2	0.0%	4.00	0.00	10.89	3.92	3.59	8.2%	16.46	12.61	8.2%	16.46	18.91
1984	35	30.5	33.8	0.0%	4.00	0.00	10.76	4.05	3.60	11.0%	22.57	12.85	11.0%	22.57	19.28
1985	37	34.2	33.8	0.0%	3.75	0.00	10.07	3.54	3.12	0.7%	1.21	11.21	0.7%	1.21	16.82
1986	36	32.9	33.6	0.0%	3.30	0.00	8.82	2.74	2.39	5.1%	7.02	8.65	5.1%	7.02	12.97
1987	35	33.6	33.6	0.0%	2.60	0.00	6.94	2.39	2.59	0.0%	0.00	7.52	0.0%	0.00	11.28
1988	35	32.9	33.5	0.0%	2.60	0.00	6.93	2.78	3.83	0.0%	0.00	8.75	0.0%	0.00	13.12
1989	20	17.1	34.1	44.2%	3.00	67.77	8.12	3.65	4.17	26.2%	67.53	11.65	44.2%	94.14	17.48
1990	29	37.5	32.1	0.0%	3.45	0.00	8.81	3.69	3.08	0.0%	0.00	11.11	0.0%	0.00	16.67
1991	34	32.5	32.5	0.0%	3.00	0.00	7.75	3.07	2.69	2.6%	3.83	9.36	2.6%	3.83	14.03
1992	40	37.5	32.9	0.0%	3.00	0.00	7.84	3.05	3.38	0.0%	0.00	9.40	0.0%	0.00	14.10
1993	29	27.6	33.3	7.8%	3.00	11.67	7.94	3.20	3.04	12.5%	19.93	9.99	12.5%	19.93	14.99
1994	42	40.7	32.8	0.0%	3.25	0.00	8.46	3.00	3.30	0.0%	0.00	9.23	0.0%	0.00	13.85
1995	24	23.1	33.9	24.4%	3.35	41.69	9.04	3.52	4.67	0.0%	0.00	11.22	24.4%	58.07	16.83
1996	35	33.1	33.0	0.0%	3.55	0.00	9.31	3.91	5.35	0.0%	0.00	12.09	0.0%	0.00	18.13
1997	62	59.8	32.1	0.0%	3.85	0.00	9.83	4.13	3.30	0.0%	0.00	12.42	0.0%	0.00	18.64
1998	48	46.2	32.2	0.0%	3.65	0.00	9.34	3.95	2.94	0.0%	0.00	11.93	0.0%	0.00	17.90
1999	48	46.9	32.4	0.0%	3.30	0.00	8.50	3.16	2.62	0.0%	0.00	9.59	0.0%	0.00	14.39
2000	40	39.7	36.9	0.0%	3.15	0.00	9.24	3.34	2.87	0.0%	0.00	11.57	0.0%	0.00	17.35
2001	41	38.2	37.2	0.0%	2.80	0.00	8.28	3.31	3.01	0.0%	0.00	11.55	0.0%	0.00	17.33
2002	45	43.9	37.4	0.0%	3.15	0.00	9.37	3.34	3.40	0.0%	0.00	11.72	0.0%	0.00	17.58
2003	57	54.3	40.3	0.0%	3.15	0.00	10.09	3.73	3.00	0.0%	0.00	14.10	0.0%	0.00	21.15
2004	48	46.6	40.7	0.0%	3.35	0.00	10.84	3.40	3.64	0.0%	0.00	12.98	0.0%	0.00	19.47
2005			44.8		3.50			3.56							
Total Farmer Paid Premium; Indemnity Payment						158.76	97.81				244.28	122.48		328.96	183.72
Farmer Paid Loss Ratio							1.62					1.99			1.79
Frequency of Claim							17%					38%			38%
Total Premium Including Subsidizes							217.35					272.18			366.27
Industry Loss Ratio							0.73					0.90			0.81

22

Clay County, IN. Corn GRP and GRIP Historical Simulated Indemnity Payments based on 30 Years of Trend Adjusted Yields (No Practice Specified)[1]

RMA's 2005 Expected County Yield 148.7
KSU's 2005 Expected County Yield 150.0
150% Maximum Liability

Year	County Yield	Planted Yield	Trend Adj. Expect Yield[2]	90% Cov GRP Pymt Rate	APH[3]	GRP Pymt	3.74% Rate GRP[4] Prem	Plant[5] Price	Harvest Price	90% Coverage GRP Pymt Rate	GRIP Pymt	5.54% Rate GRIP[6] Prem	90% GRIP-HRO Pymt Rate	GRIP-HRO Pymt	7.96% Rate GRIP-HRO[6] Prem
1973	96	92.6	98.1	0.0%	1.20	0.00	6.61	1.44	2.52	0.0%	0.00	11.71	0.0%	0.00	16.82
1974	71	66.5	100.3	26.3%	1.20	47.51	6.76	3.12	3.65	13.9%	65.03	25.99	26.3%	44.39	37.34
1975	98	93.9	98.3	0.0%	1.40	0.00	7.73	2.54	2.69	0.0%	0.00	20.75	0.0%	0.00	29.81
1976	101	99.4	99.6	0.0%	1.70	0.00	9.51	2.75	2.43	2.1%	9.41	22.71	2.1%	9.41	32.63
1977	102	99.6	102.1	0.0%	1.70	0.00	9.75	2.75	2.22	12.7%	53.52	23.33	12.7%	53.52	33.51
1978	115	113.2	103.8	0.0%	2.00	0.00	11.66	2.28	2.29	0.0%	0.00	19.61	0.0%	0.00	28.17
1979	104	100.5	107.8	0.0%	2.00	0.00	12.11	2.62	2.68	0.0%	0.00	23.46	0.0%	0.00	33.71
1980	101	98.7	109.0	0.0%	2.25	0.00	13.77	3.11	3.81	0.0%	0.00	28.14	0.0%	0.00	40.44
1981	101	95.5	109.3	2.9%	2.70	12.88	16.57	3.75	2.77	28.2%	173.37	34.00	28.2%	173.37	48.85
1982	115	112.9	109.2	0.0%	3.00	0.00	18.41	2.93	2.33	8.7%	41.96	26.60	8.7%	41.96	38.22
1983	64	61.0	110.7	38.8%	2.70	173.86	16.78	2.87	3.49	25.5%	121.47	26.37	38.8%	224.85	37.88
1984	111	109.8	105.5	0.0%	2.90	0.00	17.19	2.84	2.73	0.0%	0.00	24.85	0.0%	0.00	35.71
1985	135	133.5	106.9	0.0%	2.85	0.00	17.12	2.63	2.38	0.0%	0.00	23.40	0.0%	0.00	33.61
1986	136	129.8	111.5	0.0%	2.35	0.00	14.72	2.08	1.70	0.0%	0.00	19.30	0.0%	0.00	27.73
1987	142	139.3	115.2	0.0%	2.00	0.00	12.95	1.67	1.83	0.0%	0.00	16.02	0.0%	0.00	23.01
1988	92	89.5	118.7	16.2%	2.00	57.55	13.33	2.18	2.69	0.0%	0.00	21.44	16.2%	77.53	30.81
1989	140	138.3	115.4	0.0%	2.60	0.00	16.86	2.70	2.38	0.0%	0.00	25.90	0.0%	0.00	37.22
1990	130	127.9	119.3	0.0%	2.30	0.00	15.42	2.53	2.27	0.0%	0.00	25.09	0.0%	0.00	36.04

23

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150% Maximum Liability

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1991	108	106.5	120.9	2.1%	2.30	8.86	15.62	2.61	2.44	8.8%	41.48	26.23	8.8%	41.48	37.68
1992	148	145.7	120.3	0.0%	2.30	0.00	15.53	2.70	2.12	0.0%	0.00	26.92	0.0%	0.00	38.68
1993	134	133.0	125.5	0.0%	2.30	0.00	16.22	2.39	2.74	0.0%	0.00	24.86	0.0%	0.00	35.73
1994	145	143.8	129.1	0.0%	2.40	0.00	17.40	2.68	2.16	0.4%	1.96	28.73	0.4%	1.96	41.27
1995	123	121.7	133.0	0.0%	2.25	0.00	16.81	2.58	3.28	0.0%	0.00	28.53	0.0%	0.00	40.99
1996	108	105.8	134.5	12.6%	2.65	57.32	20.02	3.17	2.68	26.2%	157.62	35.46	26.2%	161.42	50.95
1997	112	109.2	136.90	11.4%	2.45	57.20	18.84	2.80	2.76	12.7%	74.08	31.87	12.7%	73.08	45.79
1998	106	103.1	134.20	14.7%	2.60	76.81	19.60	2.80	2.19	33.2%	187.15	31.18	33.2%	187.15	44.81
1999	149	146.7	135.70	0.0%	2.10	0.00	16.01	2.37	1.96	0.8%	4.06	26.70	0.8%	4.06	38.37
2000	157	152.9	137.20	0.0%	1.90	0.00	14.64	2.47	2.11	0.0%	0.00	33.35	0.0%	0.00	40.45
2001	159	156.3	132.40	0.0%	2.05	0.00	15.24	2.45	2.05	0.0%	0.00	27.44	0.0%	0.00	38.78
2002	136	132.8	132.40	0.0%	2.00	0.00	14.87	2.30	2.43	0.0%	0.00	23.01	0.0%	0.00	36.31
2003	154	150.5	134.90	0.0%	2.20	0.00	16.67	2.38	2.37	0.0%	0.00	24.28	0.0%	0.00	38.33
2004	175	172.7	143.80	0.0%	2.45	0.00	19.79	2.93	1.99	9.2%	58.26	34.14	9.2%	58.26	49.66
2005			148.70		2.35			2.38							
Total Farmer Paid Premium; Indemnity Payment						502.01	213.52				997.44	369.62		1,257.69	530.69
Farmer Paid Loss Ratio							2.35					2.70			2.37
Frequency of Claim							25%					41%			44%
Total Premium Including Subsidizes							474.49					821.38			1,179.32
Industry Loss Ratio							1.06					1.21			1.07

24

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1991	108	106.5	120.9	2.1%	2.30	8.86	15.62	2.61	2.44	8.8%	41.48	26.23	8.8%	41.48	37.68
1992	148	145.7	120.3	0.0%	2.30	0.00	15.53	2.70	2.12	0.0%	0.00	26.92	0.0%	0.00	38.68
1993	134	133.0	125.5	0.0%	2.30	0.00	16.22	2.39	2.74	0.0%	0.00	24.86	0.0%	0.00	35.73
1994	145	143.8	129.1	0.0%	2.40	0.00	17.40	2.68	2.16	0.4%	1.96	28.73	0.4%	1.96	41.27
1995	123	121.7	133.0	0.0%	2.25	0.00	16.81	2.58	3.28	0.0%	0.00	28.53	0.0%	0.00	40.99
1996	108	105.8	134.5	12.6%	2.65	67.32	20.02	3.17	2.68	26.2%	167.67	35.46	26.2%	167.67	50.95
1997	112	109.2	136.90	11.4%	2.45	57.20	18.84	2.80	2.76	12.7%	73.08	31.87	12.7%	73.08	45.79
1998	106	103.1	134.20	14.7%	2.60	76.81	19.60	2.80	2.19	33.2%	187.15	31.18	33.2%	187.15	44.81
1999	149	146.7	135.70	0.0%	2.10	0.00	16.01	2.37	1.96	0.8%	4.06	26.70	0.8%	4.06	38.37
2000	157	152.9	137.20	0.0%	1.90	0.00	14.64	2.47	2.11	0.0%	0.00	33.35	0.0%	0.00	40.45
2001	159	156.3	132.40	0.0%	2.05	0.00	15.24	2.45	2.05	0.0%	0.00	27.44	0.0%	0.00	38.78
2002	136	132.8	132.40	0.0%	2.00	0.00	14.87	2.30	2.43	0.0%	0.00	23.01	0.0%	0.00	36.31
2003	154	150.5	134.90	0.0%	2.20	0.00	16.67	2.38	2.37	0.0%	0.00	24.28	0.0%	0.00	38.33
2004	175	172.7	143.80	0.0%	2.45	0.00	19.79	2.93	1.99	9.2%	58.26	34.14	9.2%	58.26	49.66
2005			148.70		2.35			2.38							
Total Farmer Paid Premium; Indemnity Payment						502.01	213.52				997.44	369.62		1,257.69	530.69
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Frequency of Claim							25%					41%			44%
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Industry Loss Ratio							1.06					1.21			1.07

25

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1991	108	106.5	120.9	2.1%	2.30	8.86	15.62	2.61	2.44	8.8%	41.48	26.23	8.8%	41.48	37.68
1992	148	145.7	120.3	0.0%	2.30	0.00	15.53	2.70	2.12	0.0%	0.00	26.92	0.0%	0.00	38.68
1993	134	133.0	125.5	0.0%	2.30	0.00	16.22	2.39	2.74	0.0%	0.00	24.86	0.0%	0.00	35.73
1994	145	143.8	129.1	0.0%	2.40	0.00	17.40	2.68	2.16	0.4%	1.96	28.73	0.4%	1.96	41.27
1995	123	121.7	133.0	0.0%	2.25	0.00	16.81	2.58	3.28	0.0%	0.00	28.53	0.0%	0.00	40.99
1996	108	105.8	134.5	12.6%	2.65	67.32	20.02	3.17	2.68	26.2%	167.67	35.46	26.2%	167.67	50.95
1997	112	109.2	136.90	11.4%	2.45	57.20	18.84	2.80	2.76	12.7%	73.08	31.87	12.7%	73.08	45.79
1998	106	103.1	134.20	14.7%	2.60	76.81	19.60	2.80	2.19	33.2%	187.15	31.18	33.2%	187.15	44.81
1999	149	146.7	135.70	0.0%	2.10	0.00	16.01	2.37	1.96	0.8%	4.06	26.70	0.8%	4.06	38.37
2000	157	152.9	137.20	0.0%	1.90	0.00	14.64	2.47	2.11	0.0%	0.00	33.35	0.0%	0.00	40.45
2001	159	156.3	132.40	0.0%	2.05	0.00	15.24	2.45	2.05	0.0%	0.00	27.44	0.0%	0.00	38.78
2002	136	132.8	132.40	0.0%	2.00	0.00	14.87	2.30	2.43	0.0%	0.00	23.01	0.0%	0.00	36.31
2003	154	150.5	134.90	0.0%	2.20	0.00	16.67	2.38	2.37	0.0%	0.00	24.28	0.0%	0.00	38.33
2004	175	172.7	143.80	0.0%	2.45	0.00	19.79	2.93	1.99	9.2%	58.26	34.14	9.2%	58.26	49.66
2005			148.70		2.35			2.38							
Total Farmer Paid Premium; Indemnity Payment						502.01	213.52				997.44	369.62		1,257.69	530.69
Farmer Paid Loss Ratio							2.35					2.70			2.37
Frequency of Claim							25%					41%			44%
Total Premium Including Subsidizes							474.49					821.38			1,179.32
Industry Loss Ratio							1.06					1.21			1.07

26

Growers electing GRP probably should consider the following

- "Best farmers buy GRP because they will collect insurance but suffer no crop loss" Is that true?
- Farmers would need to have yields that are not correlated with the county
- Farmers would have less yield variable than an aggregated county yield
- Are APH based products over rated?

27

GRP Yield Basis Risk

- Do farmers want a high correlation?
- If most of the county is dry land, then and irrigated grower may collect more than the loss
- Farm land is spread out across the county or if farm sits in multiple counties.
- Enough data to calculate a correlation between farm and county yields?

28

GRP/GRIP Summary

- Little/no Protection for Hail, wind, flood or other spot losses
- If it rains on one side of the county only?
- No Prevented Planting or Re-plant Protection
- GRP insured growers worried about Rust may want to change to APH
- Farmer can suffer a total loss and receive no payment, maybe a lender concern.

29

Policy Issues

- The Corn Belt has generated underwriting gains
- Those gains allow RMA to hit the targeted loss ratio
- If the those farmers shift from APH to GRIP, then RMA may (will ?) lose a major region with consistent underwriting gains

30

Grain Sorghum Silage Index Yield

- **Index yield is a hybrid between GRP and APH**
- **Farm yields are index against county yields**
- **Gives a long run average yield**
- **Spot loss lowers "APH" yield**
- **Spot bumper crop may not increase "APH" if county also has a large crop.**

31

Thank You

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32